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Mapping the floor of Lake Mead (Nevada and Arizona): Preliminary discussion and GIS data release

USGS Open-File Report 03-320

by
David C. Twichell[1], VeeAnn A. Cross[1] and Stephen D. Belew[2]

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards (or with the North American Stratigraphic Code).

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Introduction

The U.S. Geological Survey in cooperation with the Lake Mead/Mohave Research Institute, University of Nevada, Las Vegas completed a detailed geophysical mapping of the floor of Lake Mead during 1999, 2000, and 2001. The 1999 survey covered the Boulder Basin section of the lake, the 2000 survey focused on the northwestern portion of Las Vegas Bay, and the 2001 survey covered the eastern part of the lake (Fig. 1). Results from these surveys have been presented in several reports (Cross and Twichell, 2003a; 2003b; 2003c; Twichell and others, 1999; 2001); however, here the three data sets have been integrated and are presented as a composite of the entire lake. In this section we provide a brief geologic overview of the floor of Lake Mead, and summarize some of the findings that have resulted from these surveys to provide a geologic perspective for the GIS that is the main body of this report.

Figure 1. Map showing the location of the study area and survey tracklines.

Lake Mead started to fill following the completion of Hoover Dam in 1935, and since then has supplied water to agricultural, industrial, and municipal users. The multiple uses of the lake have led to a high degree of interest in the lake. Although much of the interest is in the quality of water

within the lake, there also is interest in the geology of the lake floor. Water managers are interested in the distribution and amount of sediment that has accumulated in the lake since impoundment to understand changes in the holding capacity of the reservoir. For these reasons, this geophysical mapping program was designed to create a near-complete coverage of the lake floor using sidescan-sonar in water depth greater than about 5-10 m, and to map the distribution and thickness of post-impoundment sediment throughout the lake as derived from high-resolution seismic-reflection profiles. The map and data products derived from these datasets are intended to serve as base maps for other geological and geochemical studies of the lake.

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DVD Directory Structure

Top level directory:

disc_acc.htm - This file is the disclaimer for this DVD and describes USGS accessibility requirements.

index.htm - This file is intended to be the starting point for the DVD-ROM access. It is written in the Hypertext Markup Language utilized by the World Wide Web (WWW) project and must be opened with a WWW browser. Once opened, the user may browse the DVD-ROM's contents as they would browse pages from the WWW.

readme.txt - ASCII text file containing a description of this DVD-ROM. This file may be viewed or printed with any system program capable of opening ASCII text files.

data_sa.apr - ArcView project file created with ArcView 3.2a on a Windows2000 computer. This ArcView project contains grids and requires the ArcView extension Spatial Analyst.

data_nosa.apr - ArcView project file created with ArcView 3.2a on a Windows2000 computer. This ArcView project uses *TIFF* or *Mr. Sid* images with associated world files instead of ESRI formatted grids. This removes the dependency on the Spatial Analyst extension such that any user with ArcView version 3.2 or a later version can view the project.

Directories:

Directory data - What follows is a brief description of the data contained in the underlying directories. For a more complete description of the data, refer to the metadata

associated with each data file. This directory contains the following subdirectories:

- ***bounds*** - contains basic boundary files of the study area including the lake bounds, extent of post-impoundment sediment, and the paleo-thalweg of the Colorado River.
- ***doq*** - contains mosaicked DOQ images of the study area downsampled to 4m/pixel. These images are available in *Mr. Sid* image format, in both geographic and UTM, Zone 11, NAD83 coordinate systems.
- ***htmlseis*** - html documents containing the uninterpreted and interpreted seismic reflection profiles for all the seismic reflection profiles collected as a part of this study. The data are separated by collection year in the following subdirectories: 1999, 2000, and 2001.
- ***isopach*** - contains the isopach (sediment thickness) data from Lake Mead in both grid and *TIFF* image format.
- ***nav*** - contains navigation data separated by year of collection in the following subdirectories: 1999, 2000, and 2001.
- ***pdflogs*** - contains the PDF versions of the field logbooks maintained during each year of data collection. The logbooks are stored in the following subdirectories based on year of collection: 1999, 2000, and 2001.
- ***seisimages*** - contains JPEG images of all the seismic reflection profiles (both uninterpreted and interpreted) collected as a part of this study. The data are stored in the following subdirectories based on year of collection: 1999, 2000, and 2001.
- ***sscanimgs*** - contains sidescan-sonar mosaics. The initial directory division is based upon projection: geographic or UTM, Zone 11, NAD83. Each of these directories contains enhanced and unenhanced mosaics in *Mr. Sid* and *TIFF* formats. The mosaics are divided into 5 areas so that the final mosaic is not unmanageably large. Las Vegas Wash is mapped at 1 m/pixel, while the remaining mosaics are 2 m/pixel. In the eastern portion of the lake (east of Boulder Canyon

see Fig. 1), one set of enhanced images (only available in the UTM projection) attempts to tone-match the mosaics. These files reside in the *data/sscanimgs/utm11/dctenh* directory.

- ***surfaces*** - contains grids and images (*TIFF* and *Mr. Sid* formats) representing the present day surface of the study area. These data combine the on land DEM with the lakefloor bathymetry. The data are stored in the following subdirectories: utm11 and geographic.

Directory htmldocs: contains the HTML pages accessed within this Open-File Report (excluding the seismic HTML pages accessible from the ArcView projects). This directory contains the following subdirectories:

- ***icons*** - contains all the images files and icons utilized in constructing the Open-File Report HTML pages.
- ***pdf*** - contains the PDF version of the Open-File Report. This PDF document does not maintain all the links found on the GIS metadata and data catalog page.

Directory metadata: contains the HTML and ASCII text versions of the metadata files for all the data contained in this Open-File Report. This directory has the following subdirectores: bounds, doq, htmlseis, isopach, nav, pdflogs, seisimages, sscanimgs, and surfaces.

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WWW Browsers:

The data and information on this DVD-ROM are formatted for access and download by use of WWW information browsers (e.g., Internet Explorer, Netscape, Opera). Hyperlink references in this report to additional Internet-resident information will not function if your computer is not actively connected to the Internet (WWW) via ISP or online LAN. These web links are functional at publication, but there can be no guarantee that they will not change or be discontinued. The disk has been tested on systems utilizing the following operating systems: Windows 2000/XP, Macintosh and UNIX.

GIS:

An Environmental Systems Research Institute (ESRI) ArcView 3.2 Geographic Information System (GIS) project files, data_sa.apr and data_nosa.apr, reside in the top-level directory of this DVD. All associated GIS files are contained within the data directory. The user must have a copy of ESRI ArcView 3.2 in order to view the project files. Visit the ESRI website (http://www.esri.com) for information concerning this, and other software. Additionally, the user must also have the ESRI Spatial Analyst extension in order to view the data_sa.apr project file. For those users who do not have ArcView 3.2 or later, the individual GIS data files can still be viewed with a compatible GIS viewer, or a free GIS viewer - ArcExplorer. This GIS data viewer is available from ESRI (http://www.esri.com). Please note that the ArcExplorer software is limited to the Microsoft Windows operating systems and some UNIX operating systems.

PDF:

A PDF version of the document is available in the

htmldocs/pdf directory. PDF versions of the data acquisition logbooks are contained in the *data/pdflogs* directory. In order to view the files in the PDF format, a free copy of Adobe Acrobat Reader can be downloaded from http://www.adobe.com.

ZIP files:
This DVD contains several files compressed using the Windows program WINZIP v8.0. For those users who do not have software capable of uncompressing files of this format, software may be obtained from www.winzip.com or www.pkzip.com.

Image files:
Image files of the sidescan-sonar mosaics are available as *MrSid* images and can be viewed outside the GIS with a free image viewer available from LizardTech.

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INTRODUCTION

The U.S. Geological Survey in cooperation with the Lake Mead/Mohave Research Institute, University of Nevada, Las Vegas completed a detailed geophysical mapping of the floor of Lake Mead during 1999, 2000, and 2001. The 1999 survey covered the Boulder Basin section of the lake, the 2000 survey focused on the northwestern portion of Las Vegas Bay, and the 2001 survey covered the eastern part of the lake (Fig. 1). Results from these surveys have been presented in several reports (Cross and Twichell, 2003a; 2003b; 2003c; Twichell and others, 1999; 2001); however, here the three data sets have been integrated and are presented as a composite of the entire lake. This Geologic discussion section provides a brief geologic overview of the floor of Lake Mead, as well as summarizing some of the findings resulting from these surveys. This information is provided to provide a geologic perspective for the GIS that accompanies this report.

Figure 1. Map showing the location of the study area and survey tracklines.

Lake Mead started to fill following the completion of Hoover Dam in 1935, and since then has supplied water to agricultural, industrial, and municipal users. The multiple uses of the lake have led to a high degree of interest in the lake. Although much of the interest is in the quality of water within the lake, there is also interest in the geology of the lake floor. Water managers are interested in the distribution and amount of sediment that has accumulated in the lake since impoundment to understand changes in the holding capacity of the reservoir. For these reasons, this geophysical mapping program was designed to create a near-complete coverage of the lake floor using sidescan-sonar in water

depth greater than about 5-10 m, and to map the distribution and thickness of post-impoundment sediment throughout the lake as derived from high-resolution seismic-reflection profiles. The map and data products derived from these datasets are intended to serve as base maps for other geological and geochemical studies of the lake.

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MORPHOLOGY

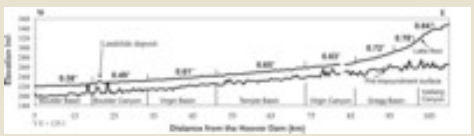
Lake Mead lies in the Basin and Range province of southern Nevada and northern Arizona,

Figure 1. Map showing the location of the study area and survey tracklines.

and is divided into several broad intermountain basins that are separated by narrow, steep-sided canyons where the former Colorado River cut through mountain ranges. The major basins are Gregg and Temple Basins in the eastern part of the lake, Virgin Basin and Overton Arm in the central part, and Boulder Basin in the western part (Fig. 1). These basins are 3-13 km wide and 14-20 km long. The margins of the basins have gentle gradients, commonly constructed from submerged alluvial fans or from Cenozoic sedimentary rocks of the Muddy Creek Formation (Longwell, 1936; 1960).

The canyons separating the basins are much narrower, and have near-vertical walls composed mostly of Precambrian and Paleozoic rocks (Longwell, 1936). The floor of Iceberg Canyon, which lies northeast of Gregg Basin, is 250-500 m wide and is straight (Fig. 1). Virgin Canyon, which separates Temple Basin from Gregg Basin, is 60-400 m wide and is sinuous. There is no canyon separating Virgin Basin from Temple Basin. Boulder Canyon, which separates Boulder Basin from Virgin Basin, is 80-400 m wide and sinuous as well.

The axial valley of the pre-impoundment Colorado River is filled with sediment,



and the gradient of the present sediment surface is shown in Figure 2 (Twichell and others, 2002; 2003). The lake floor gradient is steepest on the delta

Figure 2. Map showing the lake floor gradient from Iceberg Canyon to Boulder Basin.

front in Iceberg Canyon; however, even here the slope does not exceed 1º. In Gregg Basin the lake-floor gradient has decreased to 0.5-0.9º. Farther west, in Virgin Basin the gradient is 0.4-0.7º, and in Boulder Basin it has decreased to 0.3-0.5º. The gradient along the axial valley progressively decreases from the delta-front to the Hoover Dam except in Boulder Canyon where the lake floor rises 2-3 m as it crosses a landslide deposit emplaced shortly after the lake was filled (Leifson, 1960; Gould, 1960; Fig. 2).

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METHODS

Three years of geophysical surveys were conducted by the U.S. Geological Survey in Lake Mead totaling over 1398 km of survey lines (Fig. 1).

Figure 1. Map showing the location of the study area and survey tracklines.

These surveys included sidescan-sonar and high-resolution seismic-reflection data collection. The first year of surveying, 1999, focused on the Boulder Basin area of Lake Mead. In 2000, the surveying efforts were focused in the shallower westernmost part of the lake which included Las Vegas Bay, Las Vegas Wash, Gypsum Wash, and Government Wash. The remainder of the lake, east of Boulder Basin to the eastern end of Gregg Basin, was surveyed in 2001. This final year of surveying included Virgin Basin, Overton Arm, Iceberg Canyon and Gregg Basin. Although the methodology was very similar for the three years of surveying, equipment and processing techniques did vary between survey years. In all cases of the sidescan-sonar acquisition, a strong acoustic return, also referred to as high backscatter, appears as white and light gray tones within the imagery. A weak acoustic return, low backscatter, appears as black or dark gray. The methodology information will be summarized here, but more details of the 1999 and 2000 surveys are available from Twichell and others, (1999), and in Twichell and others, (2001), respectively.

During 2001, the Bureau of Reclamation conducted a swath bathymetry survey in Lake Mead essentially covering the areas of post-impoundment sediment accumulation. This 2001 survey utilized a high resolution multibeam mapping system for collecting x, y, and z data of the floor of Lake Mead from water depths of 3 m in the upper portions of the lake to greater than 160 m near Hoover Dam. The system consisted of a single transducer that was mounted on

the center of the bow of the boat. From the single transducer, a fan array of narrow beams generated a detailed cross section of bottom geometry as the survey vessel passed over the areas to be mapped. The system used for this survey transmitted 80 separate 1.5-degree slant beams resulting in a 120-degree swath from the transducer. The massive amounts of data collected using this system were then used to generate 10 TIN (triangulated irregular network) surfaces covering different areas of the lake floor. This high resolution data was downsampled to 10 m and 30 m cellsize grids to be included in this GIS data release.

1999 Survey:

This survey was conducted aboard a 19-m houseboat. Both the sidescan-sonar and chirp seismic-reflection data were acquired with a Benthos SIS-1000 acquisition system. This particular towfish system contains the sidescan-sonar transducers as well as a chirp seismic-reflection system with a central frequency of 3.5 kHz (2-7 kHz band). These data were logged digitally using a Triton-Elics digital acquisition system (ISIS). Two fire-rates were used for the system: one second and half second. For sidescan-sonar imagery, a one-second fire rate translates to a total swath coverage of 1500m. A half-second fire rate translates to a 750m swath coverage area. All navigation was acquired with a P-Code GPS receiver and logged to PC running an in-house software package. Singble beam bathymetry data, acquired with the Odom fathometer, were recorded with the navigation.

Both the sidescan-sonar and seismic-reflection data had initial processing completed in the field. The one-second fire-rate data were primarily used for the sidescan-sonar image. Where necessary, half-second fire rate data were used to fill data gaps of the one-second data. The sidescan-sonar imagery was demultiplexed, corrected for slant-range distortions and signal attenuation using XSonar and ShowImage software packages developed at the US Geological

Survey. These processing techniques are summarized in Danforth and others, (1991). Due to the startk contrast between highly reflective rock outcrops and fine-grained sediment deposits, XSonar software was modified in 2001 to incorporate the ability to exclude portions of the imagery from the beam angle correction routine. Since this software modification was not available until 2001, the 1999 survey data, along with the 2001 acquired data were reprocessed in late 2001. The individual files of image data were then geographically mapped using software described by Paskevich (1996). Once the individual files were mapped, then were then mosaicked digitally using Geomantic PCI remote sensing software. The techniques for generating the composite digital sidescan-sonar mosaic are summarized by Paskevich (1992).

Processing the seismic data involved two steps. The first step was to extract the seismic data from the raw SIS-1000 data files to a SEG-Y format. This utility was developed by the US Geological Survey to convert the data to a standard 16-bit unsigned integer SEG-Y format described in detail by Barry and others (1975). After the cruise, all of the seismic-reflection SEG-Y files were imported into Landmark Graphics Corp. Seisworks software package (both one-second and half-second fire rates). Seisworks enables a digital interpretation of the seismic-reflection profiles.

Details of the data acquisition are contained in the log books maintained during the cruise. These log books include the ISIS log book (for sidescan-sonar and seismic-reflection data), and the navigation log book. Because the sidesca- sonar and seismic-reflection data were acquired with the same system, only one log book was maintained for the two data types.

2000 Survey:

Due to the shallow nature of the survey area, different equipment had to be used to complete this survey. This survey was conducted aboard an 8-m pontoon boat. All

navigation were acquired with a P-Code GPS receiver and logged to a PC running Coastal Oceanographics Hypack navigation software. A single beam Garmin fathometer logged depth information to the Hypack system as well. For this survey, two different instruments were used to acquire the sidescan-sonar and seismic-reflection data.
The sidescan-sonar was acquired using an Edgetech DF-1000 system and logged to a Triton Elics digital acquisition system (ISIS). Data were collected at a 200m swath. The processing of the sidescan-sonar data was completed in the same manner as described for the 1999 survey. However, due to the small aerial coverage of this dataset and the temporal nature of the area surveyed (a large portion of this survey area is sub-aerially exposed in 2002 due to a large drop in lake level), these data did not undergo reprocessing in 2001 with the XSonar software modification.

The seismic-reflection data were acquired with a Knudsen Chirp subbottom profiling system. These data were logged to a PC laptop running Knudsen acquisition software. This particular system uses range, as opposed to fire-rate, to describe the data acquisition. The ranges used on this cruise were 50m, 100m, and 200m. After the cruise, these data were processed with SIOSEIS seismic processing software to rectify the data and convert it to "true" Chirp data containing instantaneous amplitude data. In addition, shot numbers were renumbered to start at 1. As with the 1999 data, once the adjustments to the SEG-Y data were completed, all of the seismic data collected were loaded into Landmark Graphics Corp. Seisworks software package in order to digitally interpret the data.

Details of the data acquisition are contained in the log books maintained during the cruise. These log books include the ISIS log book (for sidescan-sonar acquisition), the seismic log book (for the chirp seismics), and the navigation log book.

2001 Survey:

This survey was most similar to the 1999 survey. A 19-m houseboat was used as the survey platform. Both the sidescan-sonar and chirp seismic-reflection data were acquired with the Benthos SIS-1000 acquisition system and logged digitally using a Triton-Elics digital acquisition system (ISIS). All navigation was acquired with a P-Code GPS receiver and logged to PC running Hypack navigation software. Single beam bathymetry data acquired with an Odom fathometer was also recorded by the Hypack system.

The basic processing of the sidescan-sonar and seismic-reflection data was the same as in 1999. The acquisition system had undergone modifications, which meant some of the acquisition parameters changed. Data were collected at a 1-second and 0.53 second fire rate, which translates to a 1500m and 800m sidescan-sonar swath respectively. Also, due to system problems associated with the 1500m-swath imagery, most of the data comprising the sidescan-sonar mosaic is based on the 800m swath data. All of the sidescan-sonar data were reprocessed in 2001 to incorporate the new beam-angle parameters available in XSonar.

In addition to the seismic data acquired as part of the SIS-1000 system, several lines of single channel "boomer" seismic-reflection data were collected. This system was comprised of a Benthos streamer and a GeoPulse "boomer" sound source. This system was fired at a half-second fire rate.

Details of the data acquisition are contained in the log books maintained during the cruise. These log books include the ISIS log book (for sidescan-sonar and chirp seismic data), the seismic log book (for chirp and boomer seismic data), and the navigation log book. Because the sidescan-sonar and chirp seismic-reflection data were acquired with the same system, information pertaining to the chirp seismics tended to be written in both the ISIS and the seismic log books. To glean all the pertinent information for the chirp seismic, both the ISIS and the seismic log book should

be used.

All of the systems used during the three years of surveying are further described on the Seafloor Mapping web page (http://woodshole/operations/sfmapping/). A summary for the systems used, and other acquisition parameters are presented in Table 1.

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SIDESCAN-SONAR IMAGERY

Sidescan-sonar

Figure 3. Map showing the extent of post-impoundment sediment distribution.

imagery has enabled detailed mapping of the surficial geology of the lake floor. The sidescan-sonar imagery is presented such that a strong acoustic signal (backscatter) is white and a weak backscatter signal is black. As a generality, the post-impoundment sediment has a lower-backscatter and more uniform signature than the pre-impoundment surface. The use of sidescan-sonar imagery has allowed mapping the extent of the post-impoundment sediment throughout the lake (Fig. 3). Here we briefly describe some of the findings from the eastern, central and western portions of the lake.

In the eastern portion of the lake, the post-impoundment sediment surface has more varied backscatter strength than in the central and western parts of the lake.

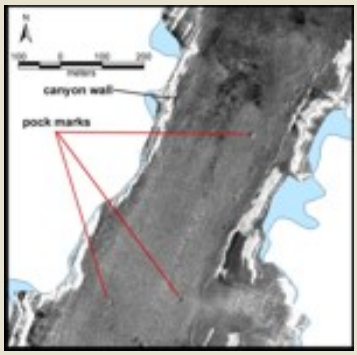

Figure 4. Sidescan-sonar imagery from Iceberg Canyon.

The post-impoundment sediment in Iceberg Canyon has a moderate backscatter signature in some areas and a low-backscatter signature in others. The northern half of the canyon shows numerous pits in the sediment surface, which appear to be gas-escape structures (Fig. 4). The seismic data suggest a high gas content in the sediment of this part of the lake (see sediment distribution and thickness section). The steep walls of Iceberg Canyon show as uniform high-backscatter bands to either side of the post-impoundment sediment.

Gregg Basin has a broader floor than Iceberg Canyon, and the post-impoundment sediment fill is flanked primarily by alluvial fans along the western side of the basin and rock ledges along the eastern side. The post-impoundment sediment fill is 1 km wide in the northern part of the basin and 2-3 km wide in the southern part (Fig. 3). This sediment mostly has a moderate backscatter signature except in the southern half of the basin where the central part is moderate backscatter and the edges are low backscatter (Fig. 5). Sediment cores indicate that near-surface sediment in Gregg Basin contains numerous fine and very-fine sand beds that are separated by silt and clay beds (Twichell and others, 2003). The sidescan-sonar imagery also shows slightly sinuous features on the surface of the post-impoundment sediment that can be traced for 3.5-4 km along the southern part of the basin (Fig. 5). These features are 30-50 m wide, have floors that tend to be moderate backscatter, and are flanked by narrow bands of high-backscatter. Along the outside of the bends the high-backscatter areas are commonly broader. These features are interpreted to be channels although they have no bathymetric expression on the seismic profiles that cross them (Twichell and others, 2002). The presence of these channels on the surface of the post-impoundment sediment indicates that they are modern channels forming by subaqueous processes.

Figure 5. Sidescan-sonar imagery from Gregg Basin.

In the central part of Lake Mead (from Virgin Canyon to Boulder Canyon) the post-impoundment sediment surface has a low-backscatter signature except in local areas where recent landslide deposits are still exposed on the lake floor. The transition to post-impoundment sediment having a low-backscatter surface occurs at the southern end of Gregg Basin where it enters Virgin Canyon. The post-impoundment sediment cover in Temple Basin is mostly less than 1 km wide and is broader in Virgin Basin where it reaches widths of 2.5 km. In Overton Arm this sediment cover is broader north of the islands in its center, and only a narrow thread of post-impoundment sediment cover can be traced south of the islands to Virgin Basin. The surface of the post-impoundment sediment in the central part of the lake shows no evidence of channels. Landslide deposits do cover small parts of the sediment surface. One landslide in the

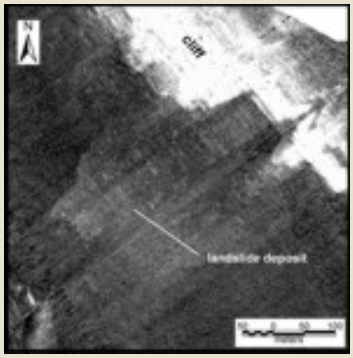

Figure 6. Sidescan-sonar imagery from Temple Basin.

eastern part of Temple Basin (Fig. 6) occurred in 1988 when the lake was at its highest level (W. Burke, 2002, personal communication). The fact that it is still exposed on the lake floor indicates that not much sediment has accumulated in this part of the lake since that time.

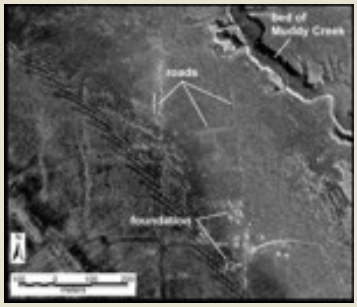

Figure 7. Sidescan-sonar imagery from Overton Arm.

One other feature of note in the central part of the lake is the town of St. Thomas that now is submerged in the northern part of Overton Arm. The streets and some foundations are still preserved on the lake floor (Fig. 7).

Boulder Basin comprises the western part of Lake Mead The post-impoundment sediment within the basin has a low-backscatter signature in contrast to Gregg Basin. These sediments are surrounded by Quaternary aged alluvial fan deposits and outcrops of older strata (Longwell, 1936; Twichell and others, 1999). The channel of the pre-impoundment Colorado River is mimicked on the present lake floor where two moderate backscatter bands correspond to the channel banks (Fig. 8). The preservation of the channel shape on the lake floor is probably due to dewatering and compaction of the very fine-grained sediment deposited in the western part of the lake.

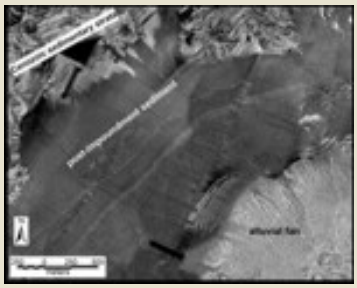

Figure 8. Sidescan-sonar imagery from Boulder Basin.

The sidescan-sonar imagery also shows a narrow band of sediment has been deposited on the floor of the axial valley in Las Vegas Bay since the lake filled (Twichell and others, 2001).

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SEDIMENT DISTRIBUTION AND THICKNESS

Analysis of the seismic-reflection data indicates that a large volume of sediment carried by the Colorado River has accumulated in Lake Mead since impoundment in 1935. The sediment is not uniformly distributed, but rather is concentrated in the deepest parts of the lake and covers the floors of the valleys cut by the Colorado River and the other tributary streams that originally flowed through the area (Twichell and others, 1999; 2001; 2002; 2003). The sediment forms a continuous cover along the entire length of the pre-impoundment Colorado River valley from the eastern extremity of the survey just east of Iceberg Canyon to the Hoover Dam at the west end of the study area. Sediment also covers the floors of the larger tributary valleys that feed the Colorado River.

Sediment filling the pre-impoundment Colorado River valley is thickest in the eastern part of Lake Mead at the mouth of the Colorado River.

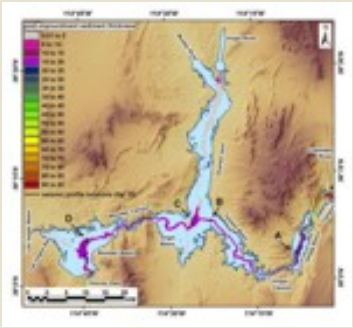

Figure 9. Isopach map of sediment thickness in Lake Mead.

Here sediment was in excess of 76 m thick (Fig. 9). Unfortunately, in this portion of the lake, gas in the sediment blanked the seismic signal and precluded subbottom imaging of this part of the deposit (Fig. 10A). Neither the chirp, nor lower frequency boomer system, could penetrate the gas-filled sediment. Here, total sediment thickness was determined by taking the difference between the present lake floor and the pre-impoundment surface surveyed prior to construction of the Hoover Dam (Smith and others, 1960). Farther west, the amount of gas in the sediment was diminished, and the seismic signal penetrated to the pre-impoundment surface. In the central third of the lake the sediment thinned to 15-25 m, and then gradually increased in

Figure 10A. Seismic reflection profile showing gas in the sediment.

thickness in the western third of the lake. These eastern portions and central third of the lake were surveyed on this 2001 cruise, and these data are contained on this DVD. Near Hoover Dam, the area surveyed in 1999 (Cross and Twichell, 2003a), sediment reaches 25 m in thickness (Twichell and others, 2001).

Post-impoundment sediment covers the floor of many of the tributaries to the pre-impoundment Colorado River, but the sediment cover is not nearly as thick. The thinner sediment cover indicates that these tributaries have not contributed nearly as much sediment as the Colorado River (Fig. 9). In the Overton Arm, sediment covers the floor of the original Virgin River channel, but here the sediment is only 1-4 m thick. Sediment derived from Las Vegas Wash, which drains the Las Vegas metropolitan area, can be traced along the entire length of the axial valley under Las Vegas Bay (Twichell and others, 2001). The sediment reaches 12 m thick in the delta off the mouth of the Wash, and beyond the delta most of the post-impoundment sediment is less than 2-m thick.

The presence of sediment along the entire 100 km length of the lake, but only in the deepest part of the lake, suggests sediment dispersal by density flows that run the full length of the lake. Colorado River water, at least during floods, has high concentrations of suspended sediment, which makes it denser than the lake water. As first described by Gould (1951), this denser river water, upon entering the lake, sinks and flows along the lake floor. The resulting deposits have a nearly flat surface, and are limited to the deepest part of the pre-impoundment Colorado River channel (Fig. 9). These seismic data have enabled the first detailed mapping of the distribution and internal structure of this deposit. The sediment distribution in the tributary valleys to the Colorado River suggests the same processes of deposition, but at a smaller scale (Twichell and others, 2001).

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SEISMIC FACIES

The seismic profiles show numerous reflectors in the post-impoundment sediment

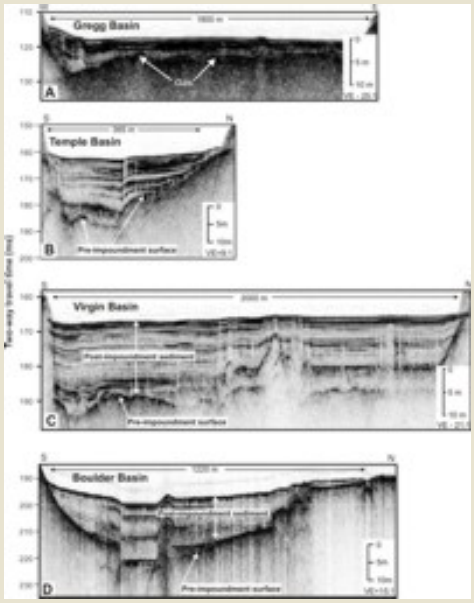

Figure 10. Seismic-reflection profiles collected normal to the Colorado River thalweg.

(Fig. 10). Many of the reflectors can be traced throughout the entire western part of the lake, but the strength of individual reflectors is variable (Twichell and others, 2002). On profiles collected normal to the thalweg, reflector strength varies laterally (Fig. 10 B, C, D). Piston cores penetrated the upper 3-5 m of the post-impoundment deposit and recovered numerous silt and very-fine sand beds in areas where reflector strength is strong. Cores contain clay and rare, thin, silt beds in areas where reflector strength is weak (Twichell and others, 2003). Clay layers separate the silty beds in the cores. Many of the reflectors coincide with the thin beds of sand or silt, but some reflectors may be caused by reverberation between closely spaced beds. Cores show that sediment in the coarser beds becomes finer to the west, and that the number and thickness of coarse beds decreases to the west. The westward decrease in reflector strength and grain size in the 3-5 m long cores suggest that reflector strength is controlled mainly by the amount of coarser sediment. Because of this relation, we used reflector strength as a proxy for mapping the distribution of fine sand, silt, and clay along the profiles.

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This report has benefited from collaboration, assistance, and support from a variety of different sources. Kenneth Parolski provided all three years of technical support during field operations. The success of the program is largely due to his talents. Vessels were leased from Calville Bay Marina for the 1999 and 2001 surveys, and we acknowledge their staff for assistance during cruise mobilization and support while in the field. We also acknowledge Gail Kaiser, Las Vegas Bay Marina, for her generosity in making one of their vessels available at no cost for the 2000 survey. The U.S. Bureau of Reclamation and the Southern Nevada Water Authority each supported parts of the fieldwork and data analysis for this project. Bill Burke, Jim Koza, Jon Lee and Mark Sappington of the National Park Service, Boulder City, NV, provided either logistical support or historical data that greatly enriched the project. Ron Simms of the Bureau of Reclamation, Boulder City, NV, provided lab space, made historical photographs available, and generously made available data and GIS abilities within the Bureau. Mark Rudin, Andrew Hanson, Brenda Buck, and Jonathan Zybala from UNLV participated in various parts of the field program, and participated in lively scientific discussions. Finally, we appreciate the constructive reviews of this report by Jane Denny and Dave Foster.

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Getting Started

Two Environmental Systems Research Institute (ESRI) ArcView 3.2 Geographic Information System (GIS) project files, *data_sa.apr* and *data_nosa.apr*, reside in the top-level directory of this DVD. All associated GIS files are contained within the *data* directory. The user must have a copy of ESRI ArcView 3.2 in order to view the project files. Visit the ESRI website (http://www.esri.com) for information concerning this, and other software.

Each project file contains a startup script which prompts the user for the drive letter of the DVD-ROM drive. This information is needed in order to establish "hotlinks" found within the project file. If the ArcView project file and the data directory are copied to the hard disk - maintaining the original directory hierarchy, then the location entered for the startup script should refer to the directory location of the ArcView project file. If for some reason the directory location is entered incorrectly, then the user can click on the pink button with the yellow CD () to reenter the information.

For those users who do not have ArcView 3.2 or later, the individual GIS data files can still be viewed with a compatible GIS viewer, or a free GIS viewer - ArcExplorer. This GIS data viewer is available from ESRI (http://www.esri.com). Please note that the ArcExplorer software is limited to the Microsoft Windows operating systems and some UNIX operating systems.

Extensions:
These projects use raster image files compressed with *Mr. Sid* Geospatial Encoder version 1.4. In order to load and view these files, the *Mr. Sid* Image Support extension must be

loaded. This extension will be loaded by default within both project files.

The *data_sa.apr* utilizes gridded data sets. As such, the Spatial Analyst extension must be loaded in order to view and manipulate these grids. This extension is loaded by default within the *data_sa.apr*. For users who do not have the Spatial Analyst extension, *data_nosa.apr* utilizes *TIFF* or *Mr. Sid* images of the grid datasets. The necessary extensions will be loaded by default within the project file.

Projection:
All of the shapefiles are in the Geographic NAD83 coordinate system. Most of the grids and images are available in both the Geographic NAD83 coordinate system, and UTM, Zone 11, NAD83 projection. Within the project files, the data loaded into the project views are all in the Geographic NAD83 coordinate system.

Hotlinking:
The seismic trackline data presented within the project files are "hotlinked" to HTML files containing the interpreted and uninterpreted JPEG images of the seismic reflection profiles. To view these HTML documents, click on the lightning bolt () within the project tool bar, and click on an individual trackline within an active trackline theme. The user's default WWW browser will be activated to view the document. These HTML documents can also be viewed directly from the *data/htmlseis* directory. These HTML documents require that the seisimages directory maintain its relative position to the *htmlseis* directory.

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Metadata and Data Catalog

Federal Geographic Data Committee (FGDC) complient metadata is available for all the data contained on this DVD. The text, HTML, and FAQ versions of the metadata reside in the "*data/metadata*" directory and the links to those files are provided below. These metadata files all contain the same information, just in slightly different formats. ArcGIS 8.2 compatible XML metadata is stored in the directory with the actual data files. In the case of non-GIS or non-text data (i.e. PDF files), the XML file resides in the directory containing that data type. For instance, the XML metadata for the 1999 PDF log books resides in the "*data/pdflogs/1999*" directory, the XML metadata for the 1999 seismic-reflection profile images resides in the "*seisimages/1999*" directory.

Shapefiles are generally comprised of *.shp, *.shx, and *.dbf files at a minimum. For the sake of brevity, only the filename prefix has been included in the filename designation listed below; extensions have been excluded. All the files necessary to load a shapefile have been compressed into a single WinZip file. Therefore, these shapefiles can be downloaded directly from the DVD, or by transferring clicking on the filename in the data catalog and saving the "zipped" files to a preferred location and uncompressing them. Image, PDF, and text files can be transferred in the same manner.

Images are available in both the *TIFF* and *Mr. Sid* image formats. The accompanying world file for

each image is necessary to display the image in its appropriate geographic location within a GIS and therefore needs to be downloaded as well. It is recommended that when downloading from the data catalog below, the *Mr. Sid* image be selected since it is a considerably smaller file.

ESRI grids cannot be copied directly from the DVD. To successfully copy an ESRI grid, ESRI software such as ArcView or ArcCatalog need to be used. For that reason, grids were exported from the ESRI software into and ESRI ASCII grid format. These ASCII grids and their projection file were then WinZipped into a single file. These "zipped" files are available for download by clicking on the filename. CAUTION: These files can be extremely large, on the order of 300 MBytes. It is recommended that the *Mr. Sid* image of the appropriate grid be downloaded instead.

Clicking on the camera icon will give a preview of the dataset. In most cases this image contains other information to help orientate the viewer. For instance, the lake bounds graphic also contains the state boundaries for reference. The hillshade relief of the study are contains the lake bounds for a reference. Not every file has a graphic. If two files differ only in format or projection, only one of the files will have a representative image.

For guidance in where to obtain software capable of reading PDF files and uncompressing zipped files, see the system requirements page.

bounds (data/bounds)

Filename	Description	Metadata
lakebnds.* 	ESRI polygon shapefile of the Lake Mead shoreline	HTML FAQ TEXT

sedlimit.* 	ESRI polygon shapefile of the extent of post-impoundment sediment within Lake Mead	HTML FAQ TEXT
thalweg.* 	ESRI polyline shapefile of the thalweg of the Colorado River prior to the formation of Lake Mead	HTML FAQ TEXT

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DOQ (data/doq)

Filename	Description	Metadata
lm_4mdoq.sid lm_4mdoq.sdw 	4m/pixel DOQ mosaic of the study area - geographic coordinate system	HTML FAQ TEXT
lm_4mdoqutm.sid lm_4mdoqutm.sdw	4 m/pixel DOQ mosaic of the study area - UTM, Zone 11, NAD83 projection	HTML FAQ TEXT

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isopach (data/isopach)

Filename	Description	Metadata
isogrid 	ESRI grid of sediment thickness within Lake Mead (UTM projection)	HTML FAQ TEXT
isogrdgeog	ESRI grid of sediment thickness within Lake Mead (geographic coordinate system)	HTML FAQ TEXT
isoimg.tif isoimg.tfw	*TIFF* image depicting sediment thickness within Lake Mead (UTM projection)	HTML FAQ TEXT
isoimg_geog.tif isoimg_geog.tfw	*TIFF* image depicting sediment thickness within Lake Mead (geographic coordiante system)	HTML FAQ TEXT

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Navigation (data/nav)
1999 navigation (data/nav/1999)

Filename	Description	Metadata
allgps_99.txt	reformatted raw navigation - ASCII text	HTML FAQ TEXT
lm99_100sht.*	ESRI point shapefile of chirp data - point every 100 shots	HTML FAQ TEXT
lm99_500sht.*	ESRI point shapefile of chirp data - point every 500 shots	HTML FAQ TEXT
seisnav_99.*	ESRI polyline shapefile indicating the tracklines along which chirp seismic-reflection data were collected	HTML FAQ TEXT

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2000 navigation (data/nav/2000)

Filename	Description	Metadata
allhyp_00.txt	reformatted raw navigation - ASCII text	HTML FAQ TEXT
lm00_100sht.*	ESRI point shapefile of chirp data - point every 100 shots	HTML FAQ TEXT
lm00_500sht.*	ESRI point shapefile of chirp data - point every 500 shots	HTML FAQ TEXT
seisnav_00.*	ESRI polyline shapefile indicating the tracklines along which chirp seismic-reflection data were collected	HTML FAQ TEXT

ssnav_00.* 	ESRI polyline shapefile indicating the tracklines along which sidescan-sonar data were collected	HTML FAQ TEXT

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2001 navigation (data/nav/2001)

Filename	Description	Metadata
allhy_01.txt	reformatted raw navigation - ASCII text	HTML FAQ TEXT
lm01_100sht.* 	ESRI point shapefile of chirp data - point every 100 shots	HTML FAQ TEXT
lm01_500sht.* 	ESRI point shapefile of chirp data - point every 500 shots	HTML FAQ TEXT
seisnav_01.* 	ESRI polyline shapefile indicating the tracklines along which chirp seismic-reflection data were collected	HTML FAQ TEXT
lm01boom.* 	ESRI polyline shapefile indicating the tracklines along which boomer seismic-reflection data were collected	HTML FAQ TEXT
lm01boom_100sht.* 	ESRI point shapefile of boomer data - point every 100 shots	HTML FAQ TEXT
lm01boom_500sht.* 	ESRI point shapefile of boomer data - point every 500 shots	HTML FAQ TEXT

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PDF log books

1999 (data/pdflogs/1999)
2000 (data/pdflogs/2000)
2001 (data/pdflogs/2001)

Filename	Description	Metadata
99014isi.pdf	PDF 1999 log book for the ISIS acquisition system (sidescan-sonar and chirp seismics)	HTML FAQ TEXT
99014nav.pdf	PDF 1999 log book for the navigation	
00027isi.pdf	PDF 2000 log book for the ISIS acquisition system (sidescan-sonar only)	HTML FAQ TEXT
00027nav.pdf	PDF 2000 log book for the navigation	
00027sei.pdf	PDF 2000 log book for chirp seismic acquisition (Knudsen)	
01007isi.pdf	PDF 2001 log book for the ISIS acquisition system (sidescan-sonar and chirp seismics)	HTML FAQ TEXT
01007nav.pdf	PDF 2001 log book for the navigation	
01007sei.pdf	PDF 2001 log book for the boomer seismic acquisition	

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Seismic JPEG images
1999 (data/seisimages/1999)
2000 (data/seisimages/2000)
2001 (data/seisimages/2001)
For the interpreted seismic-reflection profiles, the blue line represents the interpreted post-impoundment surface while the red line represented the interpreted pre-impoundment surface. Click on the above directories to see

images of the profiles. Selecting the filename below allows you to download the image collection contained in a WinZip file.

Filename	Description	Metadata
99seisinterp.zip	JPEG images of the 1999 interpreted chirp seismic-reflection profiles	HTML FAQ TEXT
99seisraw.zip	JPEG images of the 1999 uninterpreted chirp seismic-reflection profiles	
00seisinterp.zip	JPEG images of the 2000 interpreted chirp seismic-reflection profiles	HTML FAQ TEXT
00seisraw.zip	JPEG images of the 2000 uninterpreted chirp seismic-reflection profiles	
01boominterp.zip	JPEG images of the 2001 interpreted boomer seismic reflection profiles	HTML FAQ TEXT
01boomraw.zip	JPEG images of the 2001 uninterpreted boomer seismic-reflection profiles	
01chirpinthalf.zip	JPEG images of the 2001 interpreted chirp half-second seismic reflection profiles	
01chirprawhalf.zip	JPEG images of the 2001 uninterpreted chirp half-second seismic-reflection profiles	
01chirpint1sec.zip	JPEG images of the 2001 interpreted chirp one-second seismic-reflection profiles	

01chirpraw1sec.zip	JPEG images of the 2001 uninterpreted chirp one-second seismic-reflection profiles	

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Seismic HTML documents
1999 (data/htmlseis/1999)
2000 (data/htmlseis/2000)
2001 (data/htmlseis/2001/boomer)
(data/htmlseis/2001/halfsec)
(data/htmlseis/2001/onesec)

Click on the above directories to access the html documents of the seismic profiles.

Filename	Description	Metadata
99*.htm	HTML documents containing interpreted and uninterpreted chirp seismic-reflection profiles for each line of data acquired in 1999	HTML FAQ TEXT
00*.htm	HTML documents containing interpreted and uninterpreted chirp seismic-reflection profiles for each line of data acquired in 2000	HTML FAQ TEXT
01_b*.htm	HTML documents containing interpreted and uninterpreted boomer seismic-reflection profiles for each line of data acquired in 2001	HTML FAQ TEXT
01*.htm	HTML documents containing interpreted and uninterpreted chirp half-second fire rate seismic-reflection profiles for each line of data acquired in 2001	
01*.htm	HTML documents containing interpreted and uninterpreted chirp 1-second fire rate seismic-reflection profiles for each line of data acquired in 2001	

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Sidescan-Sonar Mosaics
Geographic Coordinate System

(data/sscanimgs/geographic/enhanced)
(data/sscanimgs/geographic/unenhanced)
refer to Figure 1 for location names.

Filename	Description	Metadata
bbasinenh_g.sid bbasinenh_g.sdw	enhanced *Mr. Sid* image from Boulder Basin (geographic coordinate system)	HTML FAQ TEXT
bbasinenh_g.tif bbasinenh_g.tfw	enhanced *TIFF* image from Boulder Basin (geographic coordinate system)	HTML FAQ TEXT
lvwash_eng.tif lvwash_eng.tfw	enhanced *TIFF* image from Las Vegas Wash (geographic coordinate system)	HTML FAQ TEXT
overtonenh_g.sid overtonenh_g.sdw	enhanced *Mr. Sid* image from Overton Arm (geographic coordinate system)	HTML FAQ TEXT
overtonenh_g.tif overtonenh_g.tfw	enhanced *TIFF* image from Overton Arm (geographic coordinate system)	HTML FAQ TEXT
tempiceenh_g.sid tempiceenh_g.sdw	enhanced *Mr. Sid* image from Temple Basin to Iceberg Canyon (geographic coordinate system)	HTML FAQ TEXT
tempiceenh_g.tif tempiceenh_g.tfw	enhanced *TIFF* image from Temple Basin to Iceberg Canyon (geographic coordinate system)	HTML FAQ TEXT
vbasinenh_g.sid vbasinenh_g.sdw	enhanced *Mr. Sid* image from Virgin Basin (geographic coordinate system)	HTML FAQ TEXT
vbasinenh_g.tif vbasinenh_g.tfw	enhanced *TIFF* image from Virgin Basin (geographic coordinate system)	HTML FAQ TEXT

bbasin_ungeog.sid bbasin_ungeog.sdw	unenhanced *Mr. Sid* image from Boulder Basin (geographic coordinate system)	HTML FAQ TEXT
bbasin_ungeog.tif bbasin_ungeog.tfw	unenhanced *TIFF* image from Boulder Basin (geographic coordinate system)	HTML FAQ TEXT
lvwash_ung.tif lvwash_ung.tfw	unenhanced *TIFF* image from Las Vegas Wash (geographic coordinate system)	HTML FAQ TEXT
overton_ungeog.sid overton_ungeog.sdw	unenhanced *Mr. Sid* image from Overton Arm (geographic coordinate system)	HTML FAQ TEXT
overton_ungeog.tif overton_ungeog.tfw	unenhanced *TIFF* image from Overton Arm (geographic coordinate system)	HTML FAQ TEXT
tempice_ungeog.sid tempice_ungeog.sdw	unenhanced *TIFF* image from Temple Basin to Iceberg Canyon (geographic coordinate system)	HTML FAQ TEXT
tempice_ungeog.tif tempice_ungeog.tfw	unenhanced *TIFF* image from Temple Basin to Iceberg Canyon (geographic coordinate system)	HTML FAQ TEXT
vbasin_ungeog.sid vbasin_ungeog.sdw	unenhanced *Mr. Sid* image from Virgin Basin (geographic coordinate system)	HTML FAQ TEXT
vbasin_ungeog.tif vbasin_ungeog.tfw	unenhanced *TIFF* image from Virgin Basin (geographic coordinate system)	HTML FAQ TEXT

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UTM, Zone 11, NAD83 projection mosaics
(data/sscanimgs/utm11/enhanced)
(data/sscanimgs/utm11/ unenhanced)
(data/sscanimgs/utm11/dctenh)

refer to Figure 1 for location names.

*The last four images in this section (with the asterisk) are the tone-matched images the cover the Boulder Basin area and eastward.

Filename	Description	Metadata
bbasinenh.sid bbasinenh.sdw	enhanced *Mr. Sid* image from Boulder Basin (UTM projection)	HTML FAQ TEXT
bbasinenh.tif bbasinenh.tfw	enhanced *TIFF* image from Boulder Basin (UTM projection)	HTML FAQ TEXT
lvwash_en.tif lvwash_en.tfw	enhanced *TIFF* image from Las Vegas Wash (UTM projection)	HTML FAQ TEXT
overtonenh.sid overtonenh.sdw	enhanced *Mr. Sid* image from Overton Arm (UTM projection)	HTML FAQ TEXT
overtonenh.tif overtonenh.tfw	enhanced *TIFF* image from Overton Arm (UTM projection)	HTML FAQ TEXT
tempiceenh.sid tempiceenh.sdw	enhanced *Mr. Sid* image from Temple Basin to Iceberg Canyon (UTM projection)	HTML FAQ TEXT
tempiceenh.tif tempiceenh.tfw	enhanced *TIFF* image from Temple Basin to Iceberg Canyon (UTM projection)	HTML FAQ TEXT
vbasinenh.sid vbasinenh.sdw	enhanced *Mr. Sid* image from Virgin Basin (UTM projection)	HTML FAQ TEXT
vbasinenh.tif vbasinenh.tfw	enhanced *TIFF* image from Virgin Basin (UTM projection)	HTML FAQ TEXT

bbasin_un.sid bbasin_un.sdw 	unenhanced *Mr. Sid* image from Boulder Basin (UTM projection)	HTML FAQ TEXT
bbasin_un.tif bbasin_un.tfw	unenhanced *TIFF* image from Boulder Basin (UTM projection)	HTML FAQ TEXT
lvwash_un.tif lvwash_un.tfw 	unenhanced *TIFF* image from Las Vegas Wash (UTM projection)	HTML FAQ TEXT
overton_un.sid overton_un.sdw 	unenhanced *Mr. Sid* image from Overton Arm (UTM projection)	HTML FAQ TEXT
overton_un.tif overton_un.tfw	unenhanced *TIFF* image from Overton Arm (UTM projection)	HTML FAQ TEXT
tempice_un.sid tempice_un.sdw 	unenhanced *TIFF* image from Temple Basin to Iceberg Canyon (UTM projection)	HTML FAQ TEXT
tempice_un.tif tempice_un.tfw	unenhanced *TIFF* image from Temple Basin to Iceberg Canyon (UTM projection)	HTML FAQ TEXT
vbasin_un.sid vbasin_un.sdw 	unenhanced *Mr. Sid* image from Virgin Basin (UTM projection)	HTML FAQ TEXT
vbasin_un.tif vbasin_un.tfw	unenhanced *TIFF* image from Virgin Basin (UTM projection)	HTML FAQ TEXT
*bbasin_enh.tif bbasin_enh.tfw 	enhanced *TIFF* image from Boulder Basin (UTM projection) - tonematched to overton_enh.tif, tempice_enh.tif, and vbasin_enh.tif	HTML FAQ TEXT

*overton_enh.tif overton_enh.tfw 	enhanced *TIFF* image from Overton Arm (UTM projection) - tonematched to bbasin_enh.tif, tempice_enh.tif, and vbasin_enh.tif	HTML FAQ TEXT
*tempice_enh.tif tempice_enh.tfw 	enhanced *TIFF* image from Temple Basin to Iceberg Canyon (UTM projection) - tonematched to bbasin_enh.tif, overton_enh.tif and vbasin_enh.tif	HTML FAQ TEXT
*vbasin_enh.tif vbasin_enh.tfw 	enhanced *TIFF* image from Virgin Basin (UTM projection) - tonematched to overton_enh.tif, tempice_enh.tif, and vbasin_enh.tif	HTML FAQ TEXT

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Surfaces
Geographic Coordinate System
(data/surfaces/geographic)

Filename	Description	Metadata
preshshd_g.tif preshshd_g.tfw 	*TIFF* image of the preshshd grid (geographic coordinate system)	HTML FAQ TEXT
preshshd_g.sid preshshd_g.sdw	*Mr. Sid* image of the preshshd grid (geographic coordinate system)	HTML FAQ TEXT
pres10whshd_g.tif pres10whshd_g.tfw 	*TIFF* image combining a color coded presentday grid with the preshshd grid (geographic coordinate system)	HTML FAQ TEXT

pres10whshd_g.sid pres10whshd_g.sdw	*Mr. Sid* image combining a color coded presentday grid with the preshshd grid (geographic coordinate system)	HTML FAQ TEXT
pres30hshd_g.tif pres30hshd_g.tfw	*TIFF* image of the pres30hshd grid (geographic coordinate system)	HTML FAQ TEXT
pres30hshd_g.sid pres30hshd_g.sdw	*Mr. Sid* image of the pres30hshd grid (geographic coordinate system)	HTML FAQ TEXT
pres30whshd_g.tif pres30whshd_g.tfw	*TIFF* image combining a color coded present30m grid with the pres30hshd grid (geographic coordinate system)	HTML FAQ TEXT
pres30whshd_g.sid pres30whshd_g.sdw	*Mr. Sid* image combining a color coded present30m grid with the pres30hshd grid (geographic coordinate system)	HTML FAQ TEXT

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UTM, Zone 11, NAD83 projection surfaces
(data/surfaces/utm11)

Filename	Description	Metadata
pres30hshd	ESRI hillshade grid, 30m/pixel. Present day surface Includes on land DEM, underwater surface from contours and 2002 swath bathymetry (UTM projection)	HTML FAQ TEXT
present30m	ESRI grid, 30m/pixel. Present day surface Includes on land DEM, underwater surface from contours and 2002 swath bathymetry (UTM projection)	HTML FAQ TEXT

presentday 	ESRI grid, 10m/pixel. Present day surface Includes on land DEM, underwater surface from contours and 2002 swath bathymetry (UTM projection)	HTML FAQ TEXT
preshshd 	ESRI hillshade grid, 10m/pixel. Present day surface Includes on land DEM, underwater surface from contours and 2002 swath bathymetry (UTM projection)	HTML FAQ TEXT
preshshd.tif preshshd.tfw 	*TIFF* image of the preshshd grid (UTM projection)	HTML FAQ TEXT
preshshd.sid preshshd.sdw	*Mr. Sid* image of the preshshd grid (UTM projection)	HTML FAQ TEXT
pres10whshd.tif pres10whshd.tfw 	*TIFF* image combining a color coded presentday grid with the preshshd grid (UTM projection)	HTML FAQ TEXT
pres10whshd.sid pres10whshd.sdw	*Mr. Sid* image combining a color coded presentday grid with the preshshd grid (UTM projection)	HTML FAQ TEXT
pres30hshd.tif pres30hshd.tfw 	*TIFF* image of the pres30hshd grid (UTM projection)	HTML FAQ TEXT
pres30hshd.sid pres30hshd.sdw	*Mr. Sid* image of the pres30hshd grid (UTM projection)	HTML FAQ TEXT
pres30whshd.tif pres30whshd.tfw 	*TIFF* image combining a color coded present30m grid with the pres30hshd grid (UTM projection)	HTML FAQ TEXT
pres30whshd.sid pres30whshd.sdw	*Mr. Sid* image combining a color coded present30m grid with the pres30hshd grid (UTM projection)	HTML FAQ TEXT

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Mapping the floor of Lake Mead (Nevada and Arizona): Preliminary discussion and GIS data release
OFR 03-320

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COASTAL AND MARINE GEOLOGY PROGRAM
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Road, Woods Hole, MA 02543-1598
Phone: (508) 548-8700

NAVIGATION LOG

SHIP AND CRUISE: MEAD 99014

AREA: LAKE MEAD, NV

DATES: MAY 14-25, 1999

CHIEF SCIENTIST: MARK RUDIN & DAVE TWICHELL

SHIP: _____

CRUISE: _____

DATES: _____

AREA: _____

CHIEF SCIENTIST: _____

PERSONNEL/AFFILIATION/FUNCTION

Speed of sound in ODEM 1463 m/sec

NO DRAFT IN ODEM

U

NO DRAFT IN ODEM

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
99-5-14		1851	Test line - plagger nav.					1	Start disk #1
		1946							stop nav to put in offset to antenna dx 4.57m wse dy 13.72m
		1952							Nav on again
		2016							EOL T
		201730	TST						SOL LMTST2.DAT
		2026							turning to run up canyon
		2047							EOL LMTST2
		2048	TST3						SOL LMTST3
		2052							DOGLEG
		2100							DOGLEG
		2107							dog leg
		2114							dog leg
		211931							dog leg
		212435							dog leg
		212930							dog leg
		2134							Lowered fish
		2136							dog leg

Gv

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
99-05-14	134	214040	TST3					1	dog leg
		2148							EOL LMTST3.DAT
		2149	LMTST4						SOL LMTST4.DAT
		220511							EOL LMTS4.DAT
		220520							STOP LOGGING NAV
									End of Day
99-05-15	135	1732		almost a standstill + had to fix sidemnt				9	NAV disk on
		1736		sidemnt raised to 3 feet					lot of standstill during this
		1740							attempting to turn on power to Fish
		1756							lower Fish
		1813							BOF L1F1.DAT
		1815							SOF L1F2.DAT
		1828							SOL1 BOF L1F2.DAT
		1829							SOL2 SOF L2F1.Dat
		1929							BOL2 BOF L2F1.DAT
		1931							~~BOF~~ SOF L3F1.DAT
		1937							SOL3
		2011							BOL3 BOF L3F1.DAT

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990515	135	2013						2	SOF LVP[illegible]
		2015	4						SOL 4
		2045							EOL 4
		2054	5						SOL 5
	5/6	2122	5/6						EOL 5 | SOL 6
		2150							EOL 6
									change [illegible] to 1/8 size
	7	2202							SOL 7
		2235							EOL 7
									End [illegible] 2
									End [illegible] 2
99/05/16				Lake level 1207.7		Temp 65°F			
		before leaving dock moved sidemount aft ~1m							
		1848							start NAV disk
		1908		sidemnt down 3 feet					sidemnt in water
		1920		following river valley					SOL 8
		1921							acoustic NAV on

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
91/5/16	136	2001	8	[illegible]					[illegible] CHANGE TO
									0.5 sec Rkp nav
		2009	9						SOL 9
		2084							EOL 9
		2097	10						SOL 10
		2142							EOL 10
		2147	11						SOL 11
		2159							EOL 11
		2104	12						SOL 12
		2118							EOL 12
		2185	13						SOL 13
		2144	13						EOL 13
		2150	14						SOL 14
		2218							EOL 14
		2224	15						SOL 15
		2250							EOL 15
		2255 [illegible]	16						SOL 16
		2325							EOL 16

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990516	136	2330	17					3	SOL 17
	137	0007							EOL 17
		0011	18						SOL 18
		0052							EOL 18
		0054							NAV DISK 3 OFF
990517	137	1535						4	NAV DISK ON
		1540	19						SOL 19 - LL9F1
		1607							EOL 19 (L19E)
		1611	20						SOL 20
		1644							EOL 20
		1657							SOL 21
		1723							EOL 21

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990517	130		22	1727				4	SOL 22
				1759					ISOL 22
			23	1805 (MP)					SOL 23
				1850					ISOL 23
			24	1905					SOL 24
			24	2000					ISOL 24
			25	2007					SOL 25
				2120					ISOL 25
			26	2120					SOL 26
			"	2158					ISOL 26
			27	2158					SOL 27
				2235					ISOL 27

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
99/5/18	138	~~1615~~ 1616 Z	leave Calliville Bay Marina					5	Nav disk on
		~~1635~~ 1630	nav disk off						
	138	1755							Nav disk #5 on again
		1819	28						Sdl 28 (FNSE START)
	Lake level		1207.7 ft	water temp 65°F					~~Sdl 28~~
	Sidemount down 3 ft, sidescan started @ 10m + changed to 3m on line28								
		1847							Dog leg in line 28
		1951	28						Sdl 28
	178	1951	28						Sdl 28
		8021							Isdl 28
		8030	30						Sdl 30
		8104							Isdl 30

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990518	138	2114	31					5	SOL 31
		2156							EOL 31
		2202	32						SOL 32
		2246							EOL 32
		2247							DISK #5 OFF
990519	139	154150						6	NAV DISK 6 ON
		1605	33						SOL 33
		1708							EOL 33
		1710	34						SOL 34
		1810							EOL 34
		1829	35						SOL 35
		1915							EOL 35

01

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990519	139	1917	36					4	SOL 36
		2011							EOL 36
		2019	37						SOL 37
		2050	37						EOL 37
		2052	38						SOL 38
		2122							EOL 38
99/05/20	140	1605	Transit					7	New disk on
		1615	39					7	SOL 39
		1645							EOL 39
		1649	40						SOL 40
		1715							EOL 40

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990520	139	1718	41					7	SOL 41
		1741							EOL 41
		1755	42						SOL 42
		1820							EOL 42
		1828	43						SOL 43
		1847	43						EOL 43
	139	1849	44					7	SOL 44
		1907							EOL 44
		1912	45						SOL 45
		1926							EOL 45
		1928	46						SOL 46
		1941							EOL 46

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
9905 80	140	1934	47					7	SOL 47
		1956							150L 47
		1959	48						SOL 48
		2011							150L 48
		2013	49						SOL 49
		2019							Doske Left
		2027							C/C
		2029		raise fish to 3.5m					
		2030							C/C
		2033							C/C
		2041							C/C
		2047							150L 49
		2044	50						SOL 50
		2146							150L 50

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
99 05 30	140							7	LOWER FISH TO 10 m
									CHANGE TO 1 STREAMER
		2157 (approx)							SOL 51
		2243	51						ISOL 51
									END OF DISK 7
					0				
99/05/31	141	0119	52					8	SOL 52
									ISOL 52
		1713							NEW DISK 08/5
									NEW DISK ON
		1821	52A						SOL 52A
		1833							ISOL 52A
									S
		1838	53						SOL 53
		1854							ISOL 53

14

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990521	141	1902	54					8	SOL 54
		1936							EOL 54
		1941	55						SOL 55
		2033							EOL 55
		2038	56						SOL 56
		2136							EOL
		2141	57						SOL 57
		2234							EOL 57
		2234	58						SOL 58
		2330	58						EOL 58
		2331							END DISK 8 OFF

1200.4 Z 1207.4 Z

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990522	142	1529	59					9	NAV DISK 9 ON
		1549	59						SOL 59
		1558							Dog leg in line 59
		1046							EOL 59
		1647	60						SOL 60
		1811							EOL 60
		1821	61						SOL 61
		1857							EOL 61
		1906	62						SOL 62
		1956							EOL 62
		2000	63						SOL 63
		2038							EOL 63
		2048	64						SOL 64
		2107							EOL 64

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990522	142	2114	LTST6					9	SOL LTST6
									COOMS [illegible]
		215	LTST6						EOL END
									WAV DISK 9
990523	143							10	START WAV DISK 10
		1736	65						SOL 65
		1820							EOL 65
		1823	66						SOL 66
		1841							EOL 66
		1842	67						SOL 67
		1916							C/C LEFT
									EOL 67

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990523	143	2021	69					10	SOL 69
		2025							EOL 69
		2206	69						SOL 69
									500 ms SWATH
		2130	70						SOL 70
		2154							EOL 7
									KNO DISK 10
990524	144	1734	71					11	SOL 71 START NAV DISK 11
		~1750	71						turn on fishnav
		1755	71						~~SOL~~ EOL L71F1
		1755	72						SOL L72F1
		1809	72						EOL
		1811	73						SOL 73
		1821							EOL 73

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990524	144	1827	74					n	SOL 74
		1839							1SOL 74
		1843	75						SOL 75
		1857							1SOL 75
		1900	76						SOL 76
		1918							1SOL 76
		1921	77						SOL 77
		1934							Dogleg in line 77
		1950							1SOL 77
		1952	78						SOL 78
		2001							C/C
		2004	78						C/C
		2008							1SOL 78
		2015							NAV DISK OFF

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
990525	145		79					12	START NAV DISK 12
		1427							80 79
		1656							150 79
		1703	80						82 80
		1733							150 80
									1500 OF DAY 12

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COASTAL AND MARINE GEOLOGY PROGRAM
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Road, Woods Hole, MA 02543-1598
Phone: (508) 548-8700

ISIS LOG

SHIP AND CRUISE: MEAD 99014

AREA: LAKE MEAD, NV

DATES: MAY 14 - 25, 1999

CHIEF SCIENTIST: MARK RUDIN & DAVE TWICHELL

SPEED OF SOUND IN ODEM 1463 m/sec
NO DRAFT IN ODEM

Cruise:			Chief Scientist:		Area: LAKE MEAD	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
test1	1	134	19:16	lmtst1.dat	recording to tape while Ken works on benthos range to fish
			19:46	1500 m swath	Stop ~~test line~~ NAV to put in offset to antenna
			1952		NAV on again
			2016		EOL
test 2			20:17:30	lmtst2.dat	SOL
			2026	1500m swath	turning to run up canyon - keeping same file
			2047		EOL LMTST2
test3			2048	LMTST3	SOL LMTST3.DAT
			2052	"	DOGLEG Going to do a series of dog legs back & forth
			2100	"	DOGLEG across the canyon - working our way east.
			2107	1500 m swath	dog leg
			2114	"	dog leg
			211931	"	dog leg
			212435	"	dog leg
			212930	"	dog leg
			2134	"	left fish out
			2136	"	dog leg
			214040	"	dog leg
			2148	"	EOL LMT
test4			2149	LMTST4	SOL LMTST4.DAT
			220511	1500 m swath	EOL LMTST4 EODAY
1	2	135	1732	LIFI.DAT	SOL LIFI 1500 m swath
			1740	1500m swath	attempt to turn on range to fish
			1756	"	lower fish
			1813	LIFI.DAT	ISO LIFI.DAT

Cruise:		Chief Scientist:		Area:	Page:
Line #	**Tape #**	**JulDay & Date**	**Time GMT**	**Filename**	**Remarks (seismic, nav, problems, etc.)**
1	2	135	1815	L1F2.DAT	SOF L1F2.DAT
			1828	L1F2.DAT	EOF | EOL 1
2			1829	L2F1.DAT	SOL 2 SOF L2F1.DAT
			1849		Dog leg in line 2
			1929	L2F1.DAT	EOL2 EOF
			1931	L3F1.DAT	SOF L3F1.DAT
3			1937	L3F1.DAT	SOL3
			2011	L3F1.DAT	EOL 3 \ EOF
			2013	L4F1.DAT	SOF L4F1.DAT
4			2015	"	SOL 4
			2045	"	EOL 4 EOF L4F1.DAT
5			2054	L5F1.DAT	SOL5 SOF L5F1.DAT
6			2122	L6F1.DAT	EOL 5 SOL6 SOF L6F1.DAT
			2150	L6F1.DAT	EOL 6 EOF L6F1.DAT
					changing rep rate 1/2 sec
7			2207	L7F1.DAT	SOF L7F1.DAT SOL 7 (.5 sec FIRE)
				750m swath	1/2 sec fire rate 750m swath
			2224		~~CHANGE SWEATH OUTPUT~~
					~~PWR TO~~ OUTPUT PWR
					SET AT 18 dB
			2235		EOL 7 haul gear at days end
					END EXABYTE TAPE 2
					END NAV ~~TAPE~~ DISK 2

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
1sec 8	3	136	1920	L8F1.DAT	1sec sweep - following river valley east
			1921		acoustic NAV on
			1942		VERIFY DEPTH CAL ON SIS-1000
					CAC SUB CHN FROM -20 TO -24dB
			2001	L8F1.DAT	EOL 8 / SOF CHANGE SIS-1000
					T 0.5 SEC RISE TIMES
.5sec 9			2009	L9F1.DAT	SOL 9 / SOF L9F1.DAT
			2024	L9F1.DAT	EOL 9
10			2027	L10F1.DAT	SOL 10 / SOF L10F1.DAT
			2042	L10F1.DAT	EOL 10 / EOF L10F1.DAT
11			2047	L11F1.DAT	SOL 11 SOF L11F1.DAT
			2059	L11F1.DAT	EOL 11 / EOF L11F1.DAT
12			2104	L12F1.DAT	SOL 12 SOF L12F1.DAT
			2118	L12F1.DAT	EOL 12 EOF L12F1.DAT
13			2125	L13F1.DAT	SOL 13 SOF L13F1.DAT
			2144	L13F1.DAT	EOL 13 EOF L13F1.DAT
14			2150	L14F1.DAT	SOL 14 SOF L14F1.DAT
			2218	L14F1.DAT	EOL 14 EOL L14F1.DAT
15			2224	L15F1.DAT	SOL 15 SOF L15F1.DAT
			2250	L15F1.DAT	EOL 15
16			2255 (approx)	L16F1.DAT	SOL 16 SOF L16F1.DAT
			2325	L16F1.DAT	EOL 16 EOF L16F1.DAT
17			2330	L17F1.DAT	SOL 17 SOF L17F1.DAT
		137	0007	L17F1.DAT	EOL 17 EOF L17F1.DAT

Cruise:			Chief Scientist:		Area: Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
18	3	137	0011	L18F1.DAT	SOL 18 SOF L18F1.DAT
			0052	L18F1.DAT	EOL 18 EOF L18F1.DAT
					END Group TAPE 3
19	4	137	1540	L19F1.DAT	SOL 19
			1607	L19F1.DAT	
20			1611	L20F1.DAT	SOL 20
				L20F1.DAT	
			1616		INCREASE SYSTEM OUTPUT
					POWER FROM 18dB TO 15dB
			1644		EOL 20 EOF L20F1.DAT
			1652		FISH UP TO 5m
21			1657	L21F1.DAT	SOL 21 SOF
			1723		FISH DOWN TO 10m
22			1727	L22F1.DAT	SOL 22 SOF L22F1.DAT
			1759		EOL 22 / EOF
23			1805 (AP)	L23F1.DAT	SOL 23 / SOF
			1850	L23	EOL 23 / EOF
			1454		ISIS SDS DATE off 1 DAY
24			1905	L24F1.DAT	SOL 24
			2000		EOL 24

* DATE IS ONE DAY OFF

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
25	4	990617 137	2007	L25F1.DAT	SOL 25 SOF (BAD SINT/DAT)	
			8120	L25F1.DAT	EOL 25 / EOF	
26			8120	L26F1.DAT	SOL 26 / SOF (BAD SINT/DAT)	
			8138		EOL 26 / EOF	
27			8138	L27F1.DAT	SOL 27 / SOF	
			2837		EOL 27	
28	5	990538 138	1819	L28F1.DAT	SOL 28 SOF	
			1824		Raised fish from 10 to 3m	
			1847		Dogleg in line 28	
			1919		DOGLEG IN LINE 28	
			1951	L28F1.DAT	EOL 28 / EOF	
29				L29F1.DAT	SOL 29	
			2021	L29F1.DAT	EOL 29 / EOF	
			2029	lowered fish to 10 m.		
30			2030	L30F1.DAT	SOL 30 / EOF	
			2104	L30F1.DAT	EOL 30	
31			2114	L31F1.DAT	SOL 31 / EOF	
			8156	L31F1.DAT	EOL 31 / EOF	

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
32	5	990518 138	2208	L32F1.DAT	SOL 32 | SOF
			2246	L32F1.DAT	EOL 32 | BOF
	5		2247		TAPE 5 OFF
Lake	level		1207.8 ft		WORKING OUT OF LAKE MEAD MARINA
	6	990519 139			TAPE 6 ON
33			1605	L33F1.DAT	SOL 33 | SOF
					BOFF .5 SEC RATE @ BOF
				L33F1.DAT	EOL 33
			1609		NO PITCH & ROLL
	6		1610		turning on range to fish
			1708		EOL 33
					SHUT DOWN SIS1000 !
34			1710	L34F1.DAT	SOL 34 | SOF
			1910	L34F1.DAT	EOL 34 | BOF
35			1829	L35F1.DAT	SOL 35 | SOF
					PISA UP TO 4 KNOTS
			1857		VERY SHALLOW (~3m) raise fish!
			1859		lower fish to 1st tape mark (75m)
35			1915	L35F1.DAT	EOL 35 | BOF
36	6		1987	L36F1.DAT	SOL 36 | SOF

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
36	6	990519 139	1933		dogleg in line 36	
			2011	L36F1.DAT	EOL 36 | KOF	
37			2019	L37F1.DAT	SOL37 | SOF	
~~38~~			2050		EOL37	
38			2052		SOL 38	
			2122		EOL 38 - end survey for the day	
		990520				
39	7	140	1615	L39F1.DAT	SOL 39 | SOF	
			1645	L39F1.DAT	EOL 39 | KOF	
40			1649	L40F1.DAT	SOL 40 | SOF	
			1707		ken futzing - ? Problem w/ fish nav	
			1715	L40F1.DAT	EOL 40 | KOF	
41			1718	L41F1.DAT	SOL 41 | SOF	
			1722		lowered fish TO 6.4 m	
			1749	L41F1.DAT	EOL 41 | EOF	
42			1755	L42F1.DAT	SOL 42 | SOF	
			1820	L42F1.DAT	EOL 42 | KOF	

Cruise: Cm99014		Chief Scientist:		Area: [illegible]	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
43	9	990580 140	1828	L43F1.DAT	SOL43 / SOF
				L43F1.DAT	EOL43 / EOF
44			1849	L44F1.DAT	SOL 44 / SOF
			1907	L44F1.DAT	EOL 44 / EOF
45			1912	L45F1.DAT	SOL 45 / SOF
			1926	L45F1.DAT	EOL 45 / EOF
46		140	1928	L46F1.DAT	SOL 46 / SOF
			1932		CHANGE OUTPUT POWER FROM 15dB TO 21dB
					GAIN CONTROL AT 21 dB
			1936		GAIN = 18dB POWER(OUT) = 15dB
			1941	L46F1.DAT	EOL 46 / EOF
47			1942	L47F1.DAT	SOL47 / SOF
			1956	L47F1.DAT	EOL 47 / EOF
48			1959	L48F1.DAT	SOL48 / SOF
				L48F1.DA	EOL 48 / EOF
49			2013	L49F1.DAT	SOL 49
			2019		DOCKING C/C
			2027		C/C DOCKING
			2033		C/C

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
49	7	MAR 20	2041	L49F1.DAT	C/C
			2047	L49F1.DAT	BOL 49 EOF
50			2048	L50F1.DAT	BOL 50 SOF
			2146	L50F1.DAT	EOL 50 EOF
					CHECK TO 1 SEC SWP
51					LOWER FISH TO 10m
51			2155 (approx)	L51F1.DAT	SOL 51 SOF
			2232		INCREASE OUTPUT POWER (3dB)
			2243	L51F1.DAT	BOL 51 BOF
					END OF LINE (PS TAPE)
52	8	99 050 81 149	1112	L52F1.DAT	SOL 52 SOF
				L52F1.DAT	BOL 52 EOF
52A			1681	L52AF1.DAT	SOL 52A SOF
52A					FISH @ 9.8m DEPTH
					PITCH/ROLL WORKING
					POWER CONTROL -12dB (was -18dB)
			1833	L52AF1	BOL 52A EOF
53			1438	L53F1.DAT	SOL 53 SOF
			1859	L53F1.DAT	BOL 53 EOF

Cruise:		Chief Scientist:		Area:	Page:
Line #	**Tape #**	**JulDay & Date**	**Time GMT**	**Filename**	**Remarks (seismic, nav, problems, etc.)**
54	8	990521 141	1902	L54F1.DAT	SOL 54 / SOF
			1936	L54F1.DAT	ISOL 54 / ISOF
55			1941	L55F1.DAT	SOL 55 / SOF
			2033	L55F1.DAT	ISOL 55 / ISOF
56			2038	L56F1.DAT	SOL 56 / SOF
			2136	L56F1.DAT	ISOL 56 / ISOF
57			2141	L57F1.DAT	SOL 57 / SOF
			2234	L57F1.DAT	ISOL 57 / ISOF
58			2239	L58F1.DAT	SOL 58 / SOF
			2330	L58F1.DAT	ISOL 58 / ISOF
					TAPE 8 OFF
59	9	990522 142	1545	L59F1.DAT	SOL 59
					Qmips TAPE 9 ON
			1558		Dog leg
			1634		INCREASE POWER FROM -12 TO -9 dB
59			1646	L59F1.DAT	ISOL 59
60			1647	L60F1.DAT	SOL 60
			1648		INCREASE OUTPUT PULSE TO -6dB
			1745		decrease output pulse to -6db subbottom

Targets 36° 06.23? 36. 6. ?
114° 43.156 114' 43.2250

Cruise:		Chief Scientist:			Area: Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
60	9	142	1746		Subbottom power to -12 db.
			1811	L60FI.DAT	EOL 60
61			1821	L61FI.DAT	SOL 61
			1857	L61FI.DAT	EOL 61
62			1906	L62FI.DAT	SOL 62
			1956	L62FI.DAT	EOL 62
63			2000	L62FI.DAT	SOL 63
			2038		EOL 63
64			2048	L64FI.DAT	SOL 64
			2107		EOL 64
LTSTS			2114	LTSTS.DAT	SOL TSTS | SOF
				LTSTSFI.DAT	500ms REP RATE
			2150		EOL TSTS | EOF
			21		END QMIPS TAPE 9

Cruise: **Chief Scientist:** **Area:** **Page:**

Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
65	10	143 990523	1736	L65F1.DAT	SOL 65 SOF	see fire
			1820	L65F1.DAT	EOL 65
66			1823	L66F1.DAT	SOL 66	SOF
			1841	L66F1.DAT	EOL 66	EOF
67			1842	L67F1.DAT	SOL 67	SOF
			1916		C/C L157
			2008	L67F1.DAT	EOL 67	EOF
68				L68F1.DAT	SOL 68	SOF
					036°.15.519 POSSIBLE
					114°.23.640 DEBRIS
69	10		2021	L69F1.DAT	SOL 69	SOF
			2025	L69F1.DAT	EOL 69	EOF
69A			2026	L69AF1	SOL 86A	SOF
					CHANGE TO 500 mSEC REP RATE
					36°14.447 } POSSIBLE
					114°24.716 }
					36°13.541 } POSSIBLE
					111°24.935 }

Cruise:		Chief Scientist:		Area:	Page:
Line #	**Tape #**	**JulDay & Date**	**Time GMT**	**Filename**	**Remarks (seismic, nav, problems, etc.)**
69A	10	990523 143		L69AF1.DAT	
				L69AF1.DAT	C/C LSP
					CHANGE TO 1 SEC REP RATE
			2188	L69AF1.DAT	EOL / EOF
70	10		2130	L70F1.DAT	SOL 70 / SOF
			2134	L70F1.DAT	EOL 70 EOF
					END TAPE 10
71	11	990524 144	1734	L71F1.DAT	SOL 71 / SOF START TAPE 11
					REP RATE 500 ms
					AMP @ 4
					GAIN = 18 dB POWER OUT = -12 dB
					[illegible] @ 15 dB
					FISH DEPTH @ 4 m
			fish nav on @ ~1750		CALIBRATED TO 0.07
72			1755	L71F1.DAT	EOL
			1755	L72F1.DAT	SOL
			1809	L72F1.DAT	EOL
73			1811	L73F1.DAT	SOL 73 / SOF
			1821	L73F1.DAT	EOL 73

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
74	M	990524 144	1827	L74F1,DAT	SOL 74	
			1839	L74F1,DAT	EOL 74	
75	17		1843	L75F1,DAT	SOL 75 | SOF	
			1857	L75F1,DAT	EOL 75	
76			1900	L76F1,DAT	SOL 76 | SOF	
			1918		EOL 76 | EOF	
77			1921	L77F1,DAT	SOL 77 | SOF	
			1934		dog leg	
			1950	L77F1,DAT	EOL 77 | EOF	
78			1952	L78F1.DAT	SOL 78 | SOF	
			0001		[redacted] C/C	
			2004		C/C	
78			2008		EOL 78	

Cruise: **Chief Scientist:** **Area:** **Page:**

Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
79	12	970525 145	1627	L79F1,ONT	1 SEC SWP
					POWER CONTROL -18 DB SWEEP
					GAIN PORT 15 STBD 15 SWEEP 18
			1656	L79F1,ONT	EOL 79 | EOF
80			1703	L80F1,ONT	SOL80 | SOF
			1733		EOL80 | EOF

Line 79 is actually called Line 80, so there are 2 Line 80s.

105074
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COASTAL AND MARINE GEOLOGY PROGRAM
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Road, Woods Hole, MA 02543-1598
Phone: (508) 548-8700

NAVIGATION LOG

SHIP AND CRUISE: COMMODORE CMDR 00027

AREA: Lake Mead

DATES: 1-7 June, 2000

CHIEF SCIENTIST: Twichell / Rudin

SHIP: COMMODORE

CRUISE: 00027

DATES: 1-7 June, 2000

AREA: Lake Mead

CHIEF SCIENTIST: Tunnicliff / Rowley

PERSONNEL/AFFILIATION/FUNCTION

Dave Tunnicliff - USGS

Mark Rubin - USGS

Ken Parolski - USGS

Vee Ann Cross - USGS

2

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
00/06/03	155	1341	1	0641 Local				1	Getting ready to start
				NAV DISK #1 has TEST DAY & JD155					
	157	1746			File 001_1746.DAT				stop logging
		1746							start logging
		1855							stop logging NAV

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384 Woods Hole Road, Woods Hole, MA 02543-1598
Phone: (508) 548-8700

SEISMIC/GEOPHYSICS LOG

SHIP AND CRUISE: COMMODORE CMDR 00027

AREA: Lake Mead

DATES: 1 - 7 June, 2000

CHIEF SCIENTIST: Twichell / Rudin

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
	155	1346			leave dock					
settings		GAIN 6			3ms chirp range 100 m			phase 1		
1		1419								SOL 1
		1441				locked up				
2		1452				did a loop & starting on line				SOL 2
		1514				as far up LV wash as we could go ~3km depth				EOL 2
3		1515								SOL 3
		1528								EOL 3
ran a long line up LV wash & then back. Now going to remove 1 ducer before										
we zig zag in the wash & will also change range to 50 m										
4		1548				power 1, gain 6 50 m range				SOL 4
		1550								on line
4		1555								EOL 4
5		1556								SOL 5
6		1559				SS reboot locked up 4 days				SOL 6
6		1603				SAT Link 6				SOL 6
		1607				EOL				EOL 6

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
7	155	1608								SOL 7
2		1612								BOL 7
8		1623								SOL 8
8		1626								BOL 8
9		1627								SOL 9
9		1631								BOL 9
10		1632								SOL 10
10		1636								BOL 10
11		1638								SOL 11
11		1642								BOL 11
12		1643								SOL 12
12		1645								BOL 12
13		1647								SOL 13
13		1650								BOL 13
14		1652								SOL 14
14		1655								BOL 14
15		1656								SOL 15
15		1659								BOL 15

6/3/00

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
16	156	1650								SOL 16
16		1653								EOL 16
17		1654								SOL 17
17		1656								EOL 17
18		1657								SOL 18
18		1659								EOL 18
19		1700								SOL 19
19		1702								EOL 19
20		1704								SOL 20
20		1706								EOL 20
21		1707								SOL 21
21		1709								EOL 21
22		1709								SOL 22
22		1712								EOL 22
23		1715								SOL 23
23		1717								EOL 23
24		1714								SOL 24
24		1721								EOL 24

6/05/00

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
25	155	1723								SOL 25
25		1724								EOL 25
		1725				009_1725				NAV files
26		1726								SOL 26
26		1752								EOL 26
		1753				010_1752				NAV files
27		1754								SOL 27
27		1802								EOL 27
28		1803								SOL 28
~~28~~		1817								EOL 28
29	156	1341				gain 6 range 100 pulse 3ms power level 1				SOL 29
29		1347								
30		1348								
30		1355								
31		1402								
31		1407								
32		1408								
32		1415								

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
33	1416									
33	1421					HUNG UP				
34	1428									SOL 34
34	1438									
35	1440									
35	1443					HUNG UP				
36	1451									
36	1500									
37	1501									
37	1516									
38	1517									
38	1527									
39	1528									
39	1544									
40	1546									
40	1547									
41	1548									
41	1549									

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
42	1	1550								
42		1552								
43		1553								
43		1554								
44		1555								
44		1557								
45		1557								
45		1559								
46		1559								
46		1603								
47		1603								
47		1607								
48		1608								
48		1613								
49		1614								
49		1622								
50		1631								
50		1641								

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
51		1642								
51		1651								
52		1652								
52		1701								
53		1702								
53		1710								
54		1719								
54		1721				HUNG UP				
55		1732								
55		1744								
56		1744								
56		1754								
57		1757								
57		1806								
58		2105								
58		2122								
59		2124								
59		2132				knudsen shut down says disk full				

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	~~Navigation~~ File #	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
60	2139	1556								
60	2144	|				HUNG UP				
61	2146	|								
61	2205	|								
62	2206	|								
62	2217	↓				HUNG UP				
63	157	1407								
63		1426								
64		1427								
64		1430				HUNG UP				
65		1447				~~HUNG~~				
65		1458				HUNG UP				
66		1503								
66		1516				EOL 66 (MWM GYRUM HMM)				
(66) ~~67~~		1517				SOL 661 (CONTINUE L665,66)				
~~67~~		1532				EOL 661 (UNK 66)				
67		1534			67	SOL 67				
		1543			67	EOL 67				

6/6/00

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
68	157	1546			68	SOL 68				
		1558			L68.FI	ISOL 68				
69		1550			L69FI	SOL 69				
69		1606				ISOL 69				
70		1618			L70FI	SOL 70				
70		1643				ISOL 70 (INTO GOVT WASH)				
71		1644			L71FI.DAT	SOL 71				INTO GOVT WASH
71		1702			L71FI.DAT	ISOL 71				
72		1703			~~L72FI.DAT~~ 72	SOL 72				heading out govt wash
72		1721			72	ISOL 72				ISOL 72
73		1723			73	SOL 73				SOL 73
73		1734			73					ISOL 73
74		1736			74					SOL 74
74		1745			74					ISOL 74
75		1747			75					SOL 75
1		1754			75					ISOL 75
76		1758			76					SOL 76
76		1804			76					EOL 76

6/6/00

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
77	157	1806								SOL 77
77		1811								EOL77
78		1813								SOL 78
78		1823								EOL78
79		1824								SOL 79
1		1835								EOL 79
80		1837								SOL80
1		1849								EOL80
		1855								END NAV
					LAS VEGAS WASH					GAIN AGC
										POWER 5
2132						001_2132				NAV LOGGING
81 2133										SOL 81
81 2140										EOL 81
82 2144										SOL 82
82 2151										EOL 82
										CHANGED

PULSES 3ms

2 DUCKS

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
83	157	2351								END GOL_2332
										BEG 1X575
84	158									GAIN = 12
										PWR = 5
										RNG = 200m
										PULSE = 3ms chirp
										TYP = 20 LOG R
		1434				L002_1434				START NAV LOG FILE
84	158	1437				84				SOL 84
		1503				EOF 84				EOF 84
		1503				SOF 851				SOF 851 (LINES 84)
		1508				PLUS 851				EOL 84 / SOF 851
					NO	LINES 85				

6/6/00

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
86	158	1509				FILE 86				SOL 86
		1513								(NO LINES 85)
86		1513								EOL 86
		1514								INCREASE GAIN — 16 INCREASE POWER — 6
87		1519				FILE 87				SOL 87
1		1541				FILE 87				KNUD FILES
87		1541				FILE 87				START FILES (LINE 87)
1		1612				FILE 87				EOL 87
		1613								GAIN = 10
88										POWER CUT = 2
88		1616				FILE 88				SOL 88
1		1650								EOL 88
		1652				KNUD 001_134 START 001 = 1652				
89		1652				FILE 89				REBOOT SYSTEM
										CHANGES SPIKES
										FROM 200 TO
										100 m

6/06/00

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
89	158	1701				Firing 89				SOL 89 SWATH 100m
	158	1726				EOL 89				EOL 89
90		1726				SOL 90				SOL 90
		1801				1501 96				1501 90
		1830				AT DOCK				
						LAND				
						MAV 001_1602				(AT DOCK FOR 80 MIN.)
		2203								PAPER FROM VIKING
										TURN ON CAMS
		2219				001 - 2219				START MAV
91		2223				FIRING 91				SOL 91
		2234				ABORT WARNING				

CAM < 5
POWER = 2

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COASTAL AND MARINE SCIENCE AT THE
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Rd., Quissett Campus, Woods Hole, MA 02543-1598

ISIS LOG

SHIP AND CRUISE: COMMODORE CMDR 00027

AREA: Lake Mead

DATES: 1-7 June, 2000

CHIEF SCIENTIST: Twichell / Rudin

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
1	1	156	2048 2108	L1F1	weast side Starting up Las Vegas Wash	
2		156	2104	L2F1	east side coming out Las Vegas Wash	
3		156	2124	L3F1	back up Las Vegas Wash	
			2136		EOL L3F1	
4			2137	L4F1.DAT	SOL	
			2205	L4F1.DAT	EOL	
5			2207	L5F1.DAT	SOL	
			2219	L5F1.DAT	EOL	
				END OF DAY		
63	2	157	1407	L63F1	SOL Keeping SSCan & Seismic line #'s same	
			1426	L63F1	EOL	
64	2	157	1427	L64F1	SOL/SOF	
			1430		12 WOOSH ABOARD	
	2		1437	L64F1	EOL 64 EOF	

6/05/00

Cruise:		Chief Scientist:			Area:	Page:

Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
65	2	157	1447	L65F1	SOL UP GYPSUM WASTE
			1450		LOST STKNES
65			1502	L65F1	EOL 65
66			1503	L66F1.DAT	SOL 66 OUTBOUND GYPSUM
~~66~~			~~1516~~		~~EOL 66~~
			1520		SHUT DOWN DKPNT (TEST)
			1522		DKPNT ON (XTALK POS SIDE SS
			1526		Playing with fish depth + sediment
					to reduce xtalk. - lowered fish
					~5 feet - Fish depth ~3m.
			1532	L66F1.DAT	EOL (EOL 66)
67			1533	L67F1.DAT	SOL 67
			1541	"	XTALK ON 500KHZ PROB. KNUDSEN
			1543	L67F1.DAT	EOL 67 (CHECK BATHY/SS)
68			1546	L68F1.DAT	SOL 68
68			1553	"	BATHY XTALK ON SS 100KHZ
68			1555		EOL 68 CHECK SS.
69			1557	L69F1.DAT	SOL 69
69			1606	L69F1.DAT	EOL 69
			1610		raised fish changed manual draft from 1m to 0.25m
			1612		BATHY OFF
			1614		BATHY ON / KNUDSEN ON

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Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
~~74~~	~~2~~	197				
			1616		Lower FKN = 1 hz	
70			1618	L70FI.DAT	SOL 70	
					Lost XTALK with BOTH	
1620			~~1620~~		BANY & IMAGING	
70			1643	L70 FI.DA	SOL 70	
71			1644	L71FI.DAT	SOL 71 into Gulf Wash	
71			1701	L71FI.DAT	SOL 71	
72			1703	L72FI.DAT	SOL 72 OUT from Gulf Wash	
72			1721	L72FI.DAT	SOL 72 (SMD is DOWN = to SEE)	
73			1723	L73FI.DAT	SOL 73	
73			1734	L73FI.DAT	SOL 73	
74			1736	L74FI.DAT	SOL 74 (outbound Gulf Wash)	
74			1745	L74FI.DAT	SOL 74	
75			1747	L75FI.DAT	SOL 75	
75			1754	L75FI	SOL 75	
76			1756	L76FI.DAT	SOL 76	
76			1804	L76FI.DAT	SOL 76	
77			1806	L77FI.DAT	SOL 77	
1			1811	L77 FI.DAT	SOL 77	
78			1813	L78 FI.DAT	SOL 78	
1			1823	L78 FI.DAT	SOL 78	
79			1824	L79 FI	SOL 79	
1			1835	L79 FI.DAT	SOL 79	

6/06/00

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
80	2	157	1837	L80F1.D4T	SOL 80	
1	1	1	1849	1	EOL 80	
			1855		END NAV LOGGING	

01007 105091
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COASTAL AND MARINE GEOLOGY PROGRAM
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Road, Woods Hole, MA 02543-1598
Phone: (508) 548-8700

01007nav

NAVIGATION LOG

SHIP AND CRUISE: Houseboat 200 HSBT 01007

AREA: Lake Mead

DATES: 1 April – 26 April 2001

CHIEF SCIENTIST: D. Twichell + Mark Rudin (UNLV)

SHIP: _____

CRUISE: _____

DATES: _____

AREA: _____

CHIEF SCIENTIST: _____

PERSONNEL/AFFILIATION/FUNCTION

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YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Nav file name Longitude W	Course	Speed	Disk#	Comments
01/04/01	91	2107	L1F1		001_2107.raw				Nav on + logging - manual draft=3m no pressure depth
									Antena offsets not done yet
									Offset 28 ft = 8.6 m
		2116							Fathometer off to check Xtalk
		2117							Fathometer on
		2121							Fathometer off
		2122							fathometer on
									Layback = 175 m
									Slant = ~180m
		2140							Batty - incline changed to 10
		2201							Fathometer reset
		2245	EOL1	end	001_2107.raw				
it turns out there were offsets already in the nav antenna									
	these were		stbd 1.00						
			forward -15.00						
	these are changed to					changed April 2, weather day		JD 092	
			stbd .0						
			forward -8.6						

also changed the device setup for the odom - change the update frequency from 50 ms to ~~2000~~ 1000.

(W)

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/04	94	1612	2						Gear in water
	94	1622		060_1622.raw					start log nav/bathy
		1708		ISIS down stopped logging NAV,		but then changed			my mind
		1708		~~0000~~ 061_1708.raw					restart nav logging
		1803							Nav logging off
		1836		062_1836.raw					start logging nav
		2029	3	same log file					SOL 3
		2130							EOL 3
		2134	4						SOL 4
		2236							EOL 4
		2236	5						SOL 5
01/02/01	95	0000		062_0000.RAW					SOF (NKNO JULIAN DAY)
		0046							Stop logging nav
01/04/05	95	1516		060-1516.RAW					start logging
		1526							NAVSTAR PRN CHANNEL
		1626							stop logging nav
		1626		061_1626.raw					start logging again (file chge)

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
		1802							stop logging Pulling sidemount heading in
	6 April								SIS 1000 problems
01/04/06	96	1734		064_	1734.raw				start logging nav.
		2256							end logging
01/04/08	98	1410	12	074-1410RAW	C074-1410.RAW				SOL 12 SOT
		1504	12	C74_1410					EOL 12
		1510	13						SOL 13
		1612	13						EOL 13
		1620	14						SOL 14
		1751							EOL 14
		1756	15						SOL 15
		2031	15						EOL 15
		2039	16		L074-1930RAW				SOL 16
		~~2312~~ ~~0114~~	17						SOL 17
01/04/09	99	0114							EOL 17 - stop logging

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/09	99	1404	18		096 – 1404. RAW				start logging
		1405							SOL 18
		1457	18		L18F1.DAT				EOL 18
		1502	19		L19F1.DAT				SOL 19
		1510							STBD ENGINE OFF. OIL PRESSURE DOWN SLIGHTLY, OIL IN BILGE.
		1515							
		1519			P1538-214				CC
		1532 – 1535			P3424 -3809				CC
		1550	19		L19F1.DAT				EOL 19 / SOF
		1555	20		L20F1.DAT				SOL 20 / SOF
		1720							EOL 20
		1725	21		L21F1.DAT				SOL 21
		1459	21		L21F1.DAT				EOL 21
22		1903	22		L22F1.DAT				SOL 22
		1916		NAV	CRASHED				
		1931	22		096 – 1931. RAW				start logging
		2105	1		L22F2.DAT				EOL 22

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RAW

11/13/C

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/09	99	(N) 2109	23						SOL 23
		2201			L2341.DAT				EOL 23
		2203	24		L24F1.DAT				SOL 24
		2241			"				EOL 24
		2245							END LOGGING RAW
01/04/10	100	1737	117	1737.RAW	~~L2511.DAT~~				~~SOL 25~~ START LOGGING
		1738	25						SOL 25
		1904			L25F1.DAT				EOL 25
		1908	26		L26F1.DAT				SOL 26
		2052			"				EOL 26 / EOF
		2057	27		L27F1.DAT				SOL 27 / SOF
		2216	27		"				EOL 27 / EOF
		2220	28		L28F1.DAT				SOL 28 / SOF
		2342	28		"				EOL 28 / EOF
		2344							STOP LOGGING
01/04/11	JD 101								

changed the isis out parameters to send nav to isis every 4 seconds instead of 5. Seems to make sense since plugr is updated every 2 seconds.

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/11	00101	1508		129_1508.RAW					Start logging
		1511	29						SOL 29
		1554							EOL 29
		1558							STOP LOGGING
		1602		130_1602					start logging
		1609	30						SOL 30
		1627							EOL 30
		1628	31	L31F1.DAT					SOL 31 (DISK 5?)
		1629		L31P2.DAT *	Ken accidentally called the [illegible] L32 [illegible] instead of L31F2	Doesn't exist			SOL 31 ([illegible]).
		1632		L32F1.DAT					EOL 31 / SOL 32 SOF
		1718	32						EOL 32
		1724	33	L33F1.DAT					SOL 33
		1916							EOL 33
		1918		L34F1.DAT					SOL 34
		1948		LOST Generator @ 1943					STOP LOGGING
		1955							START LOGGING
		2002		L34F2					RESTART LINE 34

L31F1 doobee doesn't exist

2

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/12	102	2151	34		L34E2.raw				EOL 34 / KILL
		2155	35		L35F1.DAT				EOL 35 / SOL
		2245	1		L35F1.DAT				EOL 35
		2247							KILL ALL LOGGING
01/04/13	103	1621	144	1621.RAW	[illegible]				START LOGGING
36		1622	36		L36F1.DAT				SOL L36F1
1		1624	1		1				EOL ~~L36F1~~ 36
37		1726	37		L37F1.DAT				SOL 37
1		1815	1		1				EOL 37
38		1819	38		L38F1.DAT				SOL 38
1		1901	1		1				EOL 38
39		1904	39		L39F1.DAT				SOL 39
~~40~~		1935	1		1				~~EOL 40~~ EOL 39
40		1940	40		L40F1.DAT				SOL 40
1		2005	1		1				EOL 40
41		2010	41		L41F1.DAT				SOL 41
1		2031	1		1				EOL 41

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/13	103	2037	42		L42P2.raw				SOL 42
		2055	"		"				EOL 42
		2100	43		L43P1.raw				SOL 43
			"		~~P1.raw~~ "				"
		2147	"						EOL 43
		2152	44		L44P1.raw				SOL 44 SOF
		2248	"						EOL 44
		2253	45						SOL 45
		0013							EOL 45
		0013							STOP MRU LOGGING
01/04/14	104	1534	"	165-1534.RAW					START LOGGING
		1535	46		L46F1.raw				SOL 46
		1641	"		"				EOL 46
		1658	47		L47F1.raw				SOL 47
		1814	"		"				EOL 47
		1819	48		L48F1.raw				SOL 48
		1953	"		"				EOL 48

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/14	104	1958	49		L49F1.DAT				SOL 49
		2115	1		1				EOL 49
		2120	50		L50F1.DAT				SOL 50
		2216	1		1				EOL 50
		2221	51		L51F1.DAT				SOL 51
		2309	1		1				EOL 51
		2313	52		L52F1.DAT				SOL 52
		2350	1		1				EOL 52
		2351							END NAV LOGGING
01/04/15	105	1350		191_1350.RAW					START LOGGING
		1350	53		L53F1.DAT				SOL 53
		1521	1		1				EOL 53
		1521	54		L54F1.DAT				SOL 54
		1650	1		L54 1				EOL 54
		1653	55		L55F1.DAT				SOL 55
		1823	1		1				EOL 55
		1828			L56F1.DAT				SOL 56

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/15	105	1936	56		L56F1.DAT				EOL 56
		1937	57		L57F1.DAT				SOL 57
		2022	1		1				EOL 57
		2027	58		L58F1DAT				SOL 58
		2153	1		1				EOL 58
		2154			1				END RAW LOGGING
01/04/16	106	1756		213_1756.RAW		had slant @ bow			start logging
		2058							end logging
									putting SIS 1000 in
		2103		213_2103.RAW					start logging
		2240							looping to start next line
		2243							SOL 60
		0000		213_0000.RAW					raw changed file
		0117							stop logging
01/04/17	107	1525		213_1525.RAW					start logging
		1527		problem w/ fathometer - Ken monkeying with it.					
		1528		fathometer seems to be okay now. From start of logging until now - bogus					

P

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/17	107	1526							SOL62
		1542							faith wacko
		1545							using both frequencies for fathometer + towing chart
		1620			L62F1				KOL62
63		1624			L63F1				SOL63
1		1649			1				KOL63
64		1655			L64F1.DAT				SOL64 NAV/ISIS clocks OK
1		1723			1				KOL64
65		1725			L65F1.DAT				SOL65 NAV/ISIS clocks OK
1		1750			1				KOL65
66		1754			L66F1.DAT				SOL 66 ISIS/NAV clocks OK
66		1949			L66F1.DAT				EOL 66
		1956			start sending LOG NAV out over com5				
		2042			fathometer going wacko again				
					CHANGE TO L66 F2 ONLY				
		2110			L66F1.DAT				KOL/EOF
		2145							

W

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/17	107	2005	67						SOL67
1	1	2010	1						kol67
	2	2113							SOL68
		2137							change batty to high freq.
		2322							END LOGGING
	01/04/18 108	1933		220-1933.RAW					start logging
		2144							STOP LOGGING
	01/04/19 109	1553		224-1553.RAW					START LOGGING
72		1559			L70M.01A				SOL72
1		1616			1				kol72
73					L73F1				SOL73
		1620				kathy	measured cored depths for drill between cores		
		1621			L73F1.DAT				SOL73
		1623			Break line to reboot ISIS				
		1627			L73F2.DAT				Start line 73 again
		1648							kol73

F

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/19	109	1701	74		[illegible]				SOL 74
		1741	↑		P 2393				c/c, but still line 74
		1827	↓		1				ISOL 74
		1833	75		[illegible]5F1				SOL 75 ISIS/MN clocks old
		2004							bathy gone bad reads 76 rather than 116
		2007							bathy good now ~ 106m
		2010							ISNO MN LOGGING
	112	1409			001_1409.RAW				start logging
	↑	1412			[illegible]				SOL 76 !
		1418			/				BOBKAT LINE ABOUT 5 KTS
		1422			[illegible]F2				SOL 76 / KMO FILES DIG [illegible]
		1428			[illegible]F3				SOL 76 ISIS/MN clocks OK
		1529			[illegible]F3				ISOL 76
		1534			[illegible]F1				SOL 77 / SCF ISIS/MN clocks OK
		1632							ISOL 77 PULL DISK
									pull fish to swap port & Stbd channel

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/24	112	1808	78		L78F1.DAT				SOL 78 PORT/STBD HOVERING
									SWITCHED. PORT IS PORT /STBD STBD
									ISIS/NAV TIMES OFF
	18	1809							SOL 78 / SOL
		1812	79		L79F1.DAT				SOL 79 ISIS/NAV CLOCKS OFF
		1908	1		1				SOL 79
		1915	80		L80F1.DAT				SOL 80
		2006	1		1				SOL 80
			81		L81F1.DAT				SOL 81
		2009			001_1409.RAW				KILL OF FILES — needed to find new CNW file
		2020		006	2020.RAW				START LOGGING
		2021			L81F1.DAT				SOL 81 STOP DIGITIZER PROG
		2107			L81F2				SOL 81 ISIS/NAV OFF
		2113	82		1				SOL 81
		2130	1		L82F1.DAT				SOL 82
			83		1				SOL 82
		2139			L82-2139.DAT				SOL 83

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/22	112	2251	83		L83_2139.DAT				EOL 83 [illegible]
		2254	84		L84F1.DAT				SOL 84
	113	0000			006_0000.RAW				Hypack changed files
		0035							Stop logging
				01/04/23					
01/04/23	113		~~86~~						Start logging
		1438							stop to check files
		1439		006_1439.RAW					start logging
		1441	85		L85F1.DAT				SOL 85
		1551	|		|				EOL 85
		1555	86		L86F1.DAT				SOL 86
		1611	|		Ping 1001				gentle c/c
		1654	|		L86F1.DAT				EOL 86
		1710	87		L87F1.DAT				SOL 87
		1731	|		|				EOL 87
		1739	88		L88F1				SOL88/SOF
		1803		stopped	sidescan	. Mechanic		from	Callville Bay is

here. Continuing to log nav

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
91/04/24	113	1802	88		L88F1.DAT				SOF
		1851			L88F2.DAT				SOF/EOF (OK IN THE PROB)
		1851			L88F3.DAT				SOF/CONTINUES LINE 88
		1855			"				EOL88/EOF
		1907	89		L89F1.DAT				SOL89/SOF
		1953			"				EOL/F 89
		2001	90		L90F1.DAT				SOL90
		2053			"				EOL90
		2103	91		L91F1.DAT				SOL91
		2202							end logging.
									putting in new line
		2204			029-2204.RAW				start logging
		~~2208~~			~~EOL9~~				
		2305	92		L92F1				SOL92
		2351			"				EOL92
		2356	93		L93F1				SOL93
		2338			NAV. seemed to lock up				

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/24	114	1731		401-1731.RAW					Start logging
		1733	94		L94F1.DAT				SOL94 1515/NAV CLOCKS OK
		1919			1				EOL94
		1925	95		L95F1				SOL95
		1929							EOL95F1
		1935			L95F2				
		2045							EOL 95F2
		2046	96		L96F1				SOL96
		2104							EOL96
		2106	97		L97F1				SOL97
		2200							EOL97
		2205	98		L98F1				SOL98
		2248	1		1				EOL98
		2259	99		L99F1.DAT				SOL99 1515/NAV Times OK
	115			401-0000.RAW					
		0020	1		L99F1.DAT				EOL99
		0026	100		L100F1.DAT				SOL100 Times OK
		0041	1		1				EOL100

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
01/04/24	115	0047	101		L101F1.RAW				SOL 101 I/NAV clocks OK
	1	0112	1		1				EOL 101
		0119			END NAV LOGGING				1
01/04/25	115	1551		406—1551.RAW					START LOGGING
		1552	102						SOL 102
		1605		lost engine, stopped QMIPS, pulled fish up - continuing to log NAV & bathy while drifting dead in the water.					
		1757	102		L102F2				SOL 102
		1835	1		1				EOL 102
		1841	103		L103F1	1sec fire			SOL 103 I/NAV clocks ok
		2008	1		1				EOL 103
		2019	104		L104B1.DAT	1sec fire			SOL 104 I/NAV clocks ok
		2048	1		1				EOL 104
		2054	105		L105F1.DAT	1sec fire			SOL 105 POSSIBLE
		1	1		L105F2.DAT				SOL 105 I/NAV clocks OK
		2126	1		1				EOL 26

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
		2129							END LOGGING
				pulling the sides on Fish and prepping					
				to run boomer lines - setting up NMEA output to Elics					
		2131	108	407 - 2131.RAW					start logging
	116	0008		1340 LOGGING					for
01/04/25	116	1534		415 - 1554.RAW					START LOGGING
		1647							Nav - windows error, but
		1651		2 blue screen of deaths, going to reboot nav					
		1656		415 - 1656.RAW					start logging
		1822			L108F2				EOF
		1827			L108F3				SOF I/NAV Checks ok
		1922		looks like Ken lost nav just prior to this -					
				jumped on the GIS laptop + don't know about the					
				other places					
		1941			L109F3				EOF
		1944			L108F4				SOF

YrMoDy	JulDy	Time+Zone	Line#	Latitude N	Longitude W	Course	Speed	Disk#	Comments
040128	~~116~~	2215	108		108 84				~~2215~~ 1502 / 108
	116	2217							END LOGGING

USGS
science for a changing world

COASTAL AND MARINE GEOLOGY PROGRAM
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Road, Woods Hole, MA 02543-1598
Phone: (508) 548-8700

01007sei.pdf

SEISMIC/GEOPHYSICS LOG

SHIP AND CRUISE: Houseboat 200 HSBT01007

AREA: Lake Mead

DATES: 1 April – 26 April 2001

CHIEF SCIENTIST: D. Twichell & Mark Rudin (UNLV)

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
1	01/04/01 91	2108			Plugger	/sec fire rate	LIFI			/sec fire rate
						Gain 18db				
						Recording: QUIPS, 16bit, 2048 samples,				
		2146				Abrupt c/c to avoid Cormorant Rock				
		2245								EOL 1
2	01/04/04 94	1612			Plgr					gear in water-turning
		1624								
		1840								SOL 2 - 1 sec fire rate
		2028								EOL 2
3		2029								SOL 3
		2130								EOL 3
4		2134								SOL 4
		2236								EOL 4
5		2236								SOL 5
6	01/04/05 95	1516								SOL 6

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
6	2001-Apr-16 96	1751				Power -12db				SOL L6F2
		1920				Gain 12db				EOL 6
		1921							L7F1	SOL 7
		1957								EOL 7
		1958			397m range	0.530 fire rate chirp length 12ms			L8F1	SOL 8
		2005-2009				P.798 - P-1064			1	C/C
		2014-2018				P-1877 - P-2270			L8F1	C/C
		2027-2029				P-3033 - P-3525			L8F1	C/C
		2037							L8F1	EOL
										STBD SS up TO 5db.
9		2043							L9F1	SOL STBD SS RCVE @ 12db
		2050-2054				P-794 - 1324				C/C
		2104-2110				P-2407 - 3094				C/C
		2117-2121				P-3910 - 4350				C/C
		2129							L9F1	EOL
10		2136							L10F1	SOL
		2145				P-1190 -				CC
		~~2155~~				P-2330 - 2387				CC

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
10	2001 APR 16 096	2201 ~~2202~~				P-2959 - 3070				CC
	[illegible]	2207 ~~2208~~				P-3077 - 3835				~~SC~~ GAIN CHANGE Gain=12dB
		2208				P 3770				SUBBTM POWER ↓ TO -21dB
						P 3920				GAIN ↓ TO 6dB
		2211								EOL 10
11		2212								SOL 11
		2214 - 2215				P233 - 320				C/C
		2224 - 2231				P-1370 - P1868				~~SC~~
		2232				~~P-2206~~				SBTM RESET TO 12dB gain 12dm pwr
11		2256								EOL 11
					8 April 2001					
13	01/04/08 098 (11)	1411				U2F1.DAT				SOL 13 / SOF
										USGS SETTINGS
										GAINS PORT 9
										STBD 15
										SUB 12
										subbottom ~~PORT~~ XMIT = -12dB

400m swp.

4

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
12	01/04/08 098	0000				L12F1.DAT				
	1435	1631				P-1640 - 2315				C/C
	1445 1450	→				P-3962 - 4416				C/C
12	1504	→								EOL 12
13	1510	→				L13F1.DAT				SOL 13
	15	1527 1534				P-2020 - P3733				C/C
		1550 1555				P-4613 - P5150				C/C
13		1612								EOL 13
14		1620				L14F1.DAT				SOL 14
		1644 - 1650				P2638-P3343				C/C
		1717-1728				P6464-P7698				
14		1751								EOL 14
15		1756				L15F1.DAT				SOL 15
		1818-1827				P2489-P3403				
		1845-1850				P5554-P6111				
		1907-1914				P7455-8761				C/C
		1917								BATHY diff/GV

01

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
15	01/04/08 JD 008	1934				~~L15F1.DAT~~				
		1934 / 1943				P 11003 - 11940				C/C
		1952 / 1959				P13625 - P 13841				C/C
		2010-2015				P 15066 - P 15692				c/c
15		2031				L15F1.DAT				EOL 15 / KOF
16		2039				L16F1.DAT				SOL16 / SOF
		2100/2106				P2362 - ~~310~~ 3010				C/C
		2128/2134				P5563 - 6189				C/C.
		2151/2203				P8855 - P9520				C/C
		2223/2229				P 11806 - P 12379				c/c
		2245/2252				P 14228 - P 15031				c/c
		2307				L16F2.DAT				EOL16 / KOF
There is an L16F2 and L17F2. File limit size was @ 200 MB & it automatically created ~~2312~~ ~~L17F1.DAT~~ those files.										(no L16F1.DAT (possibly))
17		2312				L17F1.DAT				SOL 17 / SOF
	99	0113				L17F1.DAT				EOL 17

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
	01/04/99									
18	99									GNN PED 9 db SUB OUTPUT
										STB 15 db - 18db
										SUB 12 db
										RANGE = 400m
	1	1407				L118F1.DAT				SOL 18
		1422/1425				P1685-3046				CC
		1440/1444				P3670-4200				CC
18		1457				L18F1.DAT	pingp marking course changes in NAV log			EOL 18 / KOF
19		1500				L119F1.DAT				SOL 19 / SOF
		1550				L19F1.DAT				EOL 19 / KOF
20		1555				L20F1.DAT				SOL 20 / SOF
		1609/1614				P1640-P2192				c/c
		1632/1636				P4362-P4712				c/c
		1655/1700				P6972-P7597				
20		1720								EOL 20
21		1725				L-21F1.DAT				SOL 21
		1744				P2312-2714				c/c

1748

(S)

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
21	~~04~~/09 99					L21F1.DAT				
		1908 1813				P5080-5640				C/C
		1833 1837				P8060-8529				C/C
21		1854				L21F1.DAT				ISO L21 | KOF
22		1903				L22F1.DAT				SOL 22 | SOF
		1916				36 11.527 114,24.843				LOST 11Y DATA
										BRAND LINES (Loop)
		1934				L22F2.DAT				RECAPTURE LINES 22
		1954/1958				P2293-P2767				C/C
		2029/2034				P6186-P6789				C/C
		2105				L22F3.DAT				ISO 22 | KOF
23		2109				L23F1.DAT				SOL 23 | SOF
		2116								SHUTDOWN CAUSE UNK
		2118								AIRGUN SPIKED
		2144 2149				P3852-4432				C/C
		2201				L23F1.DAT				ISO 23
24		2203				L24F1.DAT				SOL 24

8

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
24	01/~~04~~/09 99	2342				L24F1.DN				KDL 24
25	01/04/10 100					L25F1.DN				SDL 25
		1738				L25F1.DN				SDL 26
										1515 SRT SAMS
										AS JD 99
		1747 1752				P938 - 1476				C/C
		1757 1800				P2079 - 2423				C/C PAWD UP TO 9dB 4 KFT
		1810 1815				P-3551 - 4084				C/C
		1833 1838				P-6119 - 6750				C/C
25		1904				L25F1.DN				KDL 25
26		1908				L26F1.DN				SDL 26
		1938/1943				P3321 - P3881				
		2001			Appears to be a Trigger problem in subbottom on occasion					
		2010/2013				P7000 - P7342				
26		~~1408~~								
		2052				L26F1.DN				KDL 26/ KDF
		2057				L27F1.DN				SOL 27

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
27	01/04/10 100	→				L27F1.DAT				
	~~2133~~ 2136	→				P4096				C/C
27		2215				L27F1.DAT				~~EOL~~ SOL 27 / SOF
28		~~2220~~				L28F1.DAT				SOL 28 / SOF
		2300/2303				P4527 – P4916				C/C
28		2342				~~L30F28~~ L28F1.DAT				SOL 28 / SOF
		~~1115~~								
29	01/04/11 101	1511				L29F1.DAT				SOL / SOF
										DEPTH DURATION = 59.6 m
		1530/1543				P2140 – 2513				C/C
		1554								EOL 29
		1602				L30F1.DAT				FALSE START
		1608								SUBARRAY dropped / cable 2&3
30		1609				L30F2.DAT				SOL 30 / SOF
		1616								STBD SOURCE Looks OK
										POSSIBLE BAD INDEX Connector

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
30						-X L30F2.DAT				SOL 30
					Line 31 000000 doesn't exist	L30F1.DAT				FAILSIS CHOP
31		1629				L31F2.DAT * Ken called file as Disk L32F2 instead of L31F2				CHANGE PORT/STBD SS TO 12dB
32		1632				L32F1.DAT				EOL 31 / SOL 32
32		1649				P2019 - 2444				C/C
		1718				L32F1.DAT				EOL 32 CHANGE
33		1724				L33F1.DAT				SOL 33
		1757/1800				P 3736 - P 4085				C/C Hypack+ISIS time good
		1829/1834				P 7435 - P 7941				C/C Time good.
		1916				L33F1.DAT				EOL / EOF
34		1918				L34F1.DAT				SOL 34 / SOF
		1943				LOST GENERATOR				
		2003				L34F2.DAT				RESTART LINE 34
		2015/2020				P1483 - 2000				C/C
		2102/2106				P6354 - 7183				C/C
		2151				L34F2.DAT				EOL EOF
		2155				L35F1.DAT				SOL36 / SOF
		2204				L35F1.DAT				EOL / EOF

DURATION: 59.63

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
36	01/04/13									GAIN 6 SUB 9 SUBOTM 12 SUB OUT -9dB
	103	1622				L36FI.DAT				
		1710				P 5479				C/C
		1724				L36FI.DAT				SOL 36
37		1726				L37FI.DAT				SOL 37
1		1815				L37FI.DAT				EOL 37
38		1819				L38FI.DAT				SOL 38
1		1901				1				EOL 38
39		1904				L39FI.DAT				SOL 39
1		1935				1				EOL 39
40		1940				L40FI.DAT				SOL 40
1		2006				1				EOL 40
41		2010				L41FI.DAT				SOL 41
1		2031				1				EOL 41
42		2037				L42FI.DAT				SOL 42
1		2055				1				EOL 42
43		2100				~~L43FI2.DAT~~ L43FI				SOL 43
1		2115				P-1678-2035				1

9118

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
43	6/04/13	~~0731~~ 0735			~~L43F1.DAT~~	P3570 - 3945				C/C
		2147			L43F1.DAT →					KOL/KOF
44		2152				L44F1.DAT				SOL44 / SOF
		2202/2206				P1041 - P1537				C/C Hypack+ISIS time the same.
		2219/2223				P2964 - P3442				C/C
		2232/2237				P4461 - P5010				
		2248			~~L44F1.DAT~~	L44F1.DAT				EOF 44
45		2253			~~L45F1.DAT~~	L45F1.DAT				SOL 45
					2300/2304	P894 - P1293				C/C
		2307				P1677				C/C to avoid houseboat
					2313/2316	P2298 - P2676				C/C H+ISIS times good
					2324/2328	P3571 - P4045				C/C
					2336/2339	P4902 - 5260				C/C
					2347/2350	P6037 - 6501				C/C
	JD 104				0000/0004	P7760 - 8093				C/C
		0013			~~0013~~	~~L44F1.DAT~~ L45F1.DAT				KOL ~~46~~ 45
46	JD104	0535				L46F1.004				SOL 46 / SOF
						↳ thalweg line				

JD104 setting / GAIN
PORT 6
STBD 9
SUBB ~~PORT~~ PINK -9 gain 12

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
46	060414 (104)	1644				L46F1.DAT				BOL46
47		1658				L47F1.DAT				SOL47
		1708/1713				P1285/1640				C/C
		1723/1731				P3250/3577				C/C
		1743/1747				P5078/5540				C/C
		1758/1807				P6794/7218				C/C
		1814				L47F1.DAT				BOL47/EOF
48		1819				L48F1.DAT				SOL48/EOF (SSIS/NAV Times OK
		1838/1842				P2137-P2592				CC
		1905/1909				P5194-P5602				C/C
		1930/1934				P8017-P8430				C/C
		1953				L48F1.DAT				BOL48 EOF
49		1958				L49F1.DAT				SOL49/EOF (SSIS/NAV Times
		2015/2020				P1977-2569				C/C
		2038/2042				P4560-5000				C/C
		2058				P6358-6800 6879				
49		2118				L49F1.DAT				BOL49
50										

41

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
50	01/04/14	2120				L50F1.DAT				SOL50
		2135/2139				P1610-2054				c/c
		2153/2158				P3770-4280				c/c
		2206/2210				P6000-5544				c/c
		2216				L50F1.DAT				EOL50
51		2221				L51F1.DAT				SOL51
		2230/2233				P1040-P1328				c/c
		2241/2244				P2204-P2545				c/c
		2251/2255				P3345-P3830				c/c
		2302/2305				P4582-P4981				c/c
		2309				~~[illegible]~~ L51F1.DAT				EOL51 / KOF
52		2313				L52F1.DAT				SOL52
		2350				|				EOL52
53	01/05/15 105	1350				L53F1.DAT				SOL53
		1500				|				1515/WNV clocks OK
		1521				|				EOL53
54		1521				L54F1.DAT				SOL54

SS GAINS
PORT - 6dB
STBD - 9dB
SUB - 12dB
SUB POWER - 9dB
4000-Pr-CB
WAV/ISIS CLOCKS OK

15

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
54	01/095 105					L54F1				
	1	1539 1553				P730-1150				C/C
		1541/1544				P2035-2445				ESIS/NAV TIME OK
		1552/1556				P3670-P3775				C/C
		1609/1614				P5228-P5785				C/C
		1628/1632				P7359-P7821				C/C
54		1650				L54F1.ON				EOL 54/EOF
55		1653				L55F1.ON				SOL 55/SOF (NAV/ESIS TIMES OK)
		1710/1714				P1906-1714				C/C
		1733/1738				P4510-5025				C/C
		1754/1803				7400-7880				CC
55		1823				L55F1.ON				EOL 55/EOF
56		1828				L56F1.ON				SOL 56 (NAV/ESIS TIMES OK)
		1846/1852				P2259-P2725				C/C
		1913/1917				P5079-P5561				C/C
		1934				L56F1.ON				EOL 56
57		1937				L57F1.ON				SOL 57 NAV/ESIS TIMES OK
57		2028				1				EOL 57

01

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
58	01/05/15	2027				L58F1.DAT				SOL58
1		2153				)				ISOL58
					ELICS →					
									sub power -9db, gain 12db	
	106 01/16	2106				L59F1.DAT				SIS-1000 SOL59
		2113:40			Boomer turned on for a second					
		22:40								EOL 59
						looping to start next line				
		2243								SOL 60
		2357				Ken started boomer				
		2357								changed power on ISIS to -15db
		2358								changed sub power on ISIS to -18db
		0001								changed sub ISIS power to -21
		0102								turned sub gain off
		0003								EOL 60
		0005				sub power -21db gain 3db		ISIS ←		SOL 61
		0006						BOOMER ←		TEST2

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
	107	0014				13				KLICS FILTERS OFF
										1/2 SEC ~~RECORD~~ F12K
										497ms RECORD
										CHIRP/USB FILTERS 300-3K
		0015								[illegible] FILTER TO 200 KHZ
		[illegible]								CHIRP/USB GAINS 29dB
		0027								~~[illegible]~~ CHIRP GAIN UP TO 32dB
		0102								CHIRP GAIN UP TO 38dB
61		0116				1515 L61F1.DAT				SOL 61 / 1515
		0117				KLICS TEST2				SOL TEST2
	01/04/17				TUESDAY	— 17 APRIL	2001			
62	107	1526				L62F1.DAT				SOL 62
		~~1532~~ 1536				P680-1181				C/C CC
						P1198-2345				
		~~1554~~ 1558				P2142-3650				
		~~1606~~ 1610				4781-5036				
		1620				L62F1.DAT				EOL 62 EOF
63		1624				L63F1.DAT				SOL 63

1515 GAINS PORT 6, STBD 9, SUB 12
SUB POWER - 9dB
400m RANGE
NAV/1515 TIMES OK

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
63	01/04/?? 107	~~1633~~				L63F1.DAT				
		1633/1643				P1633-2239				C/C
		1649				L63F1.DAT				EOL 63
64		1655				L64F1.DAT				SOL 64
		1723								EOL 64
65		1725				L65F1.DAT				SOL 65
		1750								EOL 65
66		1754				L66F1.DAT				SOL 66
		1800/1803				P570-945				C/C
		1809				1504-1628				CC
		1815/1817				P2357-P2585				C/C ISIS+HP times good
		1835/1839				P4562-P5039				C/C
		1859/1903				P7256-P7778				C/C
		1923/1926				P10049-P10608				
		1949				12962 L66F1.DAT				EOL 66
						ISIS has date as April 16 - probably recording wrong JD to file				
67		2005				L67F1			B	SOL/SOF
		2015							B	GAIN CHANGE THROW BACK TO 32 dB

JD 107
BOOMER/KLEIN SETTINGS

Boomer: 1/2 SEC FIRES
1/2 SEC RECORD (497)
280 JOULES

GAIN = 32 dB
FILTERS = 300 HZ - 3 KHZ

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
67	01/04/17 107	2016				L67F1.DAT				GAIN TO 35 dB
|						|				ADJUST TVG
										SONICS AMPLITUDES SCALES
	2110					L67F1.DAT				SOL | SOF
68	2113					L68F1.DAT				SOL | SOF
	2121									CHANGE CALIBRATION TO
										2500 TO 11000
	2129					L68F1.				Start logging Boomer
	2016									PICK ADJUST & PICK GATE
										STRETCHER ADJUST
										SYSTEM — CHECK GAINS
										TO 38 dB KLICS AMP TO
	2021									GAIN TO 35 dB
	2321					L68F1.				KSA 68 KLICS
	01/04/18									
01/04/18	108	1933				108-1933.RAW				Start logging
	108					TVG1.DAT		sub-bottom power 5db gain 12db		SOL TVG
		1959				ALL SYSTEMS NORMAL				

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
	01/04/08 108	2008								EOL TVG1
69		2010					L69F1			SOL 69
		2034								EOL 69
70		2043					L70F1			SOL 70
		2100								PITCH/ROLL/HEADING NOT WORKING
		2107								EOL 70
71		2111								SOL 71
|		2144								EOL 71
72	01/04/19 109	1559				L72F1.DON				SOL 72 SOF 1818/mv clears ok
|	|	1607				|			SO [illegible] MISSING PINGS
|	|	1616				L72F1.04				EOL 72 REBOOT 1515
73		1621				L73F1.DON				SOL 73
|		1623								Bad Line
|		1628				L73F2				RESTART LINE 73
|		~~1644~~				|			P
|		1678				|			EOL 73

109 RSIS GAIN PORT 3 STBD 3 SUBBTM 12 SUB POWER -9dB 750m RANGE RNC GMPS 16BIT/8018

GAIN [illegible]

2

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
74	07/04/19 109	1701				L74F1.DAT				SOL 74 1SK / now closes 072
|		1741				P2393				c/c, adjust line 74
|		1820				L74F1.DAT				EOL 74 / 1SOF
75		1833				L75F1.DAT				SOL 75 / 1SOF
		1923				P2947				C/C
		2001				P 5221				c/c - dogleg
		2010				L75F1.DAT				EOL 76
76	112	1413				L76F.DAT				SOL 76
|	|	1418				|				[illegible] LINES RESTART SS GAINS
|	|	1487				L76F2				SOL / RESTART DIGITIZER ERROR
|	|	1508				L76F3				SOL 76
|		1529			~~1529~~	|				EOL 76
77		1534				L77F1.DAT				SOL 77
		1549				|				PORT/STBD CHANNELS
										[illegible] ON LINES
		|								[illegible]
		1632								EOL 77 PULL DISK
										[illegible] CHANNEL

JD 112
SB [illegible]

S10KSEAN GAINS
PORT - 6
STBD - 6
SUB - 12

SUB POWER - 9
[illegible] = 750
1637 | 2048

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
78	01/04/22 112	1708				L78F1.DAT				SOL 78 BOAT IS PORT & BUOYS SWITCHED
|						|				
|		1804				|			1802 78
79		1812				L79F1.DAT				SOL 79
|		1908				|			EOL 79
80		1915				L80F1.DAT				SOL 80
|		1952				P2259				slight c/c
|		2002				P2823				slight c/c in line 80
|		2006				L80F1.DAT				EOL 80
81		2021				L81F1.DAT				SOL 81 KILL GUNS PROBS
|		2029				L81F2				SOL 81
|		2107				|			EOL 81
82		2113				L82F1.DAT				SOL 82
|		2130				|			EOL 82
83		|				~~L83F1.DAT~~				~~SOL 83~~
/		2139				112-2139.DAT				SOL 83
		2241				112-2139 .DAT				EOL 83
		2243							0530	RANGE TO 400m RANGE & fire rate

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
84	01/04/22 112	2354				L84F1.DAT				SOL 84
	113	0035				)				ISOL84
	01/04/23				01/04/23					
85	113	1441				L85F1.DAT	1sec fire			SOL 85
)		1551				)				ISOL 85
86		1555				L86F1	1sec fire			SOL 86
		1611				P1001				gentle c/c
		1654				)				ISOL 86
87		1710				L87F1	1sec fire			SOL 87
)		1731				L87F1				ISOL 87
88		1739				L88F1	1sec fire			SOL/SOF
	180	→				)				EOF ★
		1851				L88F2	1sec fire			SOF / EOF (OBTAINED ERROR)
		1851				L88F3	1sec fire			RESTARTED LINE 88 (CONTINUE)
		1855				)				ISOL / ISOF
89		1901				L89F1.DAT	1sec fire			SOL89 / SOF

JD113 SUB BTM GAIN = 12 dB
POWER = 9 dB
750 m RANGE

★ BREAK LINE 1802
in SEISMIC

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
89	04/04/23 113	1953				L89F1.DAT				EOL 89 / BOL
90		2001				L90F1.DAT		1sec fire		SOL 90
1		2053				1				EOL 90
91		2103				L91F1.DAT		1sec fire		SOL 91
1		2201				1		1	1	EOL 91
92		2205				L92F1.DAT		1sec fire		SOL 92
1		2251				1				EOL 92
93		2256				L93F1.DAT		1sec fire		SOL 93
		2329				P 1972				start dog leg
		2333				P 2215				end dog leg
		2345				L93F1		1 sec fire		EOL 93
	04/04/24									
94	114				~~Begin Line~~	L94F1.DAT	1sec fire	power-gun gen		SOL 94
1		1919				1				EOL 94
95		1925				L95F1	1sec fire			SOL 95
		1929								EOL 95F1
		1935				L95F2	1sec fire			SOL 95F2
		2045								EOL 95

25

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
96	01/04/24 114	2046				L96F1 [illegible]	1sec fire			SOL
		2104								EOL
97		2106				L97F1 [illegible]	see fire rate			SOL 97
		2122				Piz 938				c/c - dog leg
		2200								EOL 97
98		2205				L98F1	1sec fire			SOL 98
"		2248				"				EOL 98
99		2257				L99F1.DAT	1sec fire			SOL 99
	115	0020				"				EOL 99
100	"	0026				L100F1.DAT	1sec fire			SOL 100
"		0041				"				EOL 100
101		0047				L101F1.DAT	1sec fire			SOL 101
"		0112				"				EOL 101
	01/04/25									
102	115	1552			1secfixrak	L102F1.DAT	power gain -9db 12db	1sec fire		SOL 102
"		1957			"	L102F2.DAT				SOL 102
"		1835				"				EOL 102
103		1841				L103F1				SOL 103

26

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
103	01/04/26 115	1920	ping		2306	L103F1 1 sec	fire			CC
|		2008				|				EOL 103
104		2019				L104F1.DAT				SOL 104
|		2048				|				EOL 104
105		2054				L105F1.DAT				SOL 105 RESTART
|		|				L105F2.DAT				SOL 105
|		2126				|				EOL 105
						BOOMER				
106		2159				L106F1.DAT				SOL 106
		2217				"				EOL/EOF
|										REBOOT SYS - DOES NOT
|										RECOGNIZE AU32 BOARD
|										GAIN DOWN TO 26dB
|		2232				L106F3.DAT				SOL
|		2301				L106F3.DAT				EOL

JD 115 BOOMER SETUP

1/2 SEC FIRE
280 JOULES

CHIRP FILTER 200 HZ - 3 KHZ
GAINS - 32 dB

FILES SAMPLING RATE
BLOCKS = 500 m — 12000
SWP: 480 ms
CALIBRATION - 1:2750 MV

Line#	YrMoDy +JulDy	Time +Zone	Crs	Spd	Navigation	Seismic System Sweep/Fire/Filters	Tape# Disk#	Roll#	Magnets Gravity	Comments
107	010425 115	2303				L107F1				SOL / RKSTRT
		2303				L107F2				SOL 107
		2335				|				C/C
		2357								Increase Gain to 32dB
	116	0008								SOL 107
108	010425 116				1600	L108F1.DAT			B	SOL 108
					1651	|			|	Ended File Break Line
					1659	L108F2.DAT				Restart Line 108
										Gain up to 38dB
					1822	L108F2.DAT				EOF
					1827	L108F3.DAT				SOF
					1941	|				EOF
					1944	L108F4.DAT				SOF
					2215	|				EOL / EOL 108

Boomer
1/2 sec fire
280 Joules

Channels filters 300Hz - 3kHz
samples @ 10000
Calibration @ 2000 mV

Klein filters 360-3600kHz
1GC

29

USGS
science for a changing world

COASTAL AND MARINE SCIENCE AT THE
WOODS HOLE FIELD CENTER (WHFC)

384 Woods Hole Rd., Quissett Campus, Woods Hole, MA 02543-1598

01007isi.pdf

ISIS LOG

SHIP AND CRUISE: Houseboat 200 HSBT 01007

AREA: Lake Mead

DATES: 1 April - 26 April 2001

CHIEF SCIENTIST: D. Twichell + M. Rudin (UNLV)

Cruise: S	Chief Scientist:	Area:	Page:

Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
1		91	2108	L1F1	Start logging
				range 750.1	-12 db output on subbottom
					Gain: port 15db stbd 15 db
					Gain: subbot 18db
					Recording: QMIPS - 16 bit - 2048 samples
					Antena offsets not done yet.
					Antena offset = 8.6 m
					Layback ~ 17.5 m, slant ~ 18.0 m
			2146		Abrupt c/c to avoid Cormorant Rk
			2245	L1F1	EOL
*	see	note	in navigation log regarding offsets.		
~~					
2		94	1624	L2F1	SOL 2 sidescan gain 12 subbott gain 15
				~~L2F2~~	ISIS locked up.
2			1625	L2F2	manual slant = 18.1 m
					layback = 17.85
					range = 750 m
					Fish depth = 10 ft = 3 m.
			1632		ISIS locked - reboot
2			1842	L2F3	SOL 2 - at beginning of line
			1858		PORT CHANNEL NOISY ~~OFF~~ from
					~~STBD~~ START @ F LINE until now
2			2028	L2F3	EOL

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
3		94	2029	L3F1	SOL LINE 3 750m range
			2130	L3F1	EOL 3 - Muddy River Δ
4			2134	L4F1	SOL LINE 4
			2236		EOL Line 4
5			2236	L5F1	SOL LINE 5 750m range
5		95	0045		EOL 5
		95			Gains changed on IS 15 to 9db on
					sidescan & subbottom 12db
6		95	1516	L6F1	SOL 6
			1607		Stbd channel dropped out
			1612	and L6F1	bringing fish aboard to check
					stbd channel as it is not firing
6	6 April	96			subbottom power=12 gain=12db
					sidescan gain = 9 & 9db
6		96	1751	start L6F2	Start logging - I see fire rate
					stbd side appears very weak.
			1920		EOL 6
7			1921	start L7F1	SOL 7 750 m range
			1957		EOL 7
8			1958	L8F1	SOL 8 changed to 397m range 0.530s fire
			2037		EOL 8
					change ST BD gain to 15dB
9			2043	L9F1	SOL 9 397 m range
			2129	L9F1	EOL 9

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
10		96	2136	L10F1	SOL 10	397 m range
			2211	L10F1	EOL 10	
11			2212	L11F1	SOL 11	397 m range
			2256	—	EOL 11	END NAV LOG
12	April 2001	98	1411	L12F1	SOL 12	0.530 fire rate 397 m range GAINS port 9 stbd 15
			1504		EOL 12	
13			1510	L13F1.DAT	SOL 13	397 m range
			1612		EOL 13	
14			1620	L14F1.DAT	SOL 14	397 m range
			1751		EOL 14	
15			1756	L15F1.DAT	SOL 15	& a L15F2 397m range reached a max. file size
			2031		EOL 15	
16			2039	L16F1.DAT	SOL 16	397 m range
			2307		EOL 16 (L16F1 MIGHT DBE L16F2.)	
	Lines 15 & 16 each have an of 200 MB was on & it				F2 - the file size limit had an automatic switch.	
17			2312	L17F1	SOL 17	397m range
17		98	0113	L17F1	EOL 17	
18		99	1407	L18F1	SOL 18	stbd gain 15 db port gain 9 db
			1457		EOL 18	397m range
19			1502	L19F1	SOL 19	397 m range
			1550		EOL 19	

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
20		99	1555	L20F1	SOL 20	397 m range
			1720		EOL 20	
21			1725	L21F1	SOL 21	397 m range
			1859		EOL 21	
22			1903	L22F1	SOL 22	397 m range
			1916		NAV CRASH BKSPACE LINES	
			1934	L22F2	SOL 22F2 after crash	
			2105	L23F2	EOL 22 / SOL 23	
23			2109	L23F1.DAT	SOL 23 / SOL 397 m range	
			2116		slow down to check to see	
					if something is snagged on fish	
			2118		Back up to speed	
24			2203	L24F1	SOL 24	397 m range
			2324		EOL 24	
25		100	1738	L25F1.DAT	SOL 25	397 m range
			1904	L25F1.DAT	EOL 25	
26			1908	L26F1.DAT	SOL 26	397 m range
			2053		EOL 26 SOL	
27			2057	L27F1.DAT	SOL 27 / SOL	397 m range
27			2215	"	EOL 27 / SOL	
28			2220	L28F1.DAT	SOL 28 / SOL	397 m range
			2342		EOL 28 / SOL	
					EOD	

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
29		101	1511	L29F1	SOL L29	stbd 15↓b port 9db
			1554		EOL 29	397 m range
					pulled gear - too rough	
30	April 12	102	1602	L30F1	SOL L30 - FALSE START	
				these gains are changed from the previous days	DON'T PROCESS	
			1609	L30F2	SOL 30 @ portgain 9 Stbd gain 9	
			1627		EOL 30	397m range
			1628	L31F1 DOESN'T EXIST		
31			1629	L31N2	SOL 31 DOUBLE : 12 STBD = Q	
32			1632	L32F1	SOL 31 | SOL 32	397 m range
					SS PORT SIDE "STRIPEY" AND	
					SLOW FUZZY BOTTOM TRACK. (PWR)	
			1649		CHANGE SS GAINS TO 6 dB	
			1718	L32F1	SOL 32 ~~CHANGE SS GAINS TO 6dB~~	
33			1724	L33F1.DAT	SOL 33 change offsets Line 33 NOT 32	
			1812		last stbd channel - still there	
					but voltage down here. 5 to 3	
			1916	L33F1.DAT	SOL | 1445 CHANGE STBD GAIN TO 10dB	
34			1918	L34F1.DAT	SOL 34 | SOL 397 m range	
			1943	LOST	GENERATOR	
			2002	L34F2	SOL L34F2 397m range	
			2151		EOL 34	port still @ 10db
					change stbd gain to 9db	
35			2158	L35F1	SOL 35 397 m range	
			2245	L35F1	SOL 35	

JD 103

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
36		01/04/13 103	1622	L36F1.DAT	SOL 36 / SOF	port gain 6db Stbd gain 9db
			1710		c/c ping 5479	
			1724		EOL 36 / BOF	
37			1726	L37F1.DAT	SOL 37	397 m range
1			1815	L37F1.DAT	EOL 37	
38			1819	L38F1.DAT	SOL 38	397 m range
1			1906	1	EOL 38	
39			1904	L39F1.DAT	SOL 39	397 m range
1			1935	1	EOL 39	
40			1940	L40F1.DAT	SOL 40	397 m range
1			2005	1	EOL 40	
41			2010	L41F1.DAT	SOL 41	397 m range
1			2031	1	EOL 41	
42			2037	L42F1.DAT	SOL 42	397 m range
1			2055	1	EOL 42	
43			2100	L43F1.DAT	SOL 43	397 m range
1			~~2115~~	~~01678~~	~~c/c~~	
			2147	1	ISOL 43	
44			2152	L44F1.DAT	SOL 44	397 m range
1			2248		EOL ~~43~~ 44	
45			2253	L45F1.DAT	SOL 45	397 m range
			0013	1	ISOL 45	
					397m range	port gain 6
46	Apr 14, 2001		1535	L46F1	SOL 46	Stbd gain 9
			1633		ISIS / NAV Check OK	

Cruise:		Chief Scientist:			Area: Page:
Line #	**Tape #**	**JulDay & Date**	**Time GMT**	**Filename**	**Remarks (seismic, nav, problems, etc.)**
46		104 04/14	1644	L46F1.DAT	SOL 46
↓			running	tests	
Test					Change settings: 16BIT/1024
					200m range 0.25 sec
			1647	TEST1.DAT	SOL
			1649	"	EOL
			1650	TEST2.DAT	750m range (1sec) SOL
			~~1654~~		2048 pixels
			1654		Return to original settings test over
47			1658	L47F1.DAT	SOL 47 397m range
↓			1707	↓	SS/NAV times OK
↓			1814		EOL 47 / EOF
48			1819	L48F1.DAT	SOL 48 / SOF 397m range
↓			1953	↓	EOL 48
49			1958	L49F1.DAT	SOL 49 397 m range
↓			2115	↓	EOL 49 times
50			2120	L50F1.DAT	SOL 50 / (ISIS/NAV ~~times~~ nurks
↓			2216	↓	EOL 50 397m range
51			2221	L51F1.DAT	SOL 51 397m range
↓			2309	↓	EOL 51
52			2313	L52F1	SOL 52 (ISIS/NAV clocks OK
↓			2350	↓	EOL 52 397m range

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
53		105	1350	253F1	SOL Port gain 6 db Stbd gain 9db	
1			1521	1	1SOL 53	397 m range
54			1531	L54F1.DAT	SOL 54	397 m range
1		+6	1650	1	1SOL 54	
55			1653	L55F1.DAT	SOL 55	397 m range
1			1823	1	1SOL 55	
56			1828	L56F1.DAT	SOL 56	397 m range
1			1936	1	1SOL 56	
57			1937	L57F1.DAT	SOL 57	397 m range
1			2022	1	1SOL 57	
58			2027	L58F1.DAT	SOL 58 (NW/SE) OK	
1			2153	1	EOL 58	397 m range
59		106	2106	L59F1.DAT	SOL 59 Port gain 6 Stbd gain 9	
			2240		EOL 59	397 m range
					looping to start next line	
60			2243		SOL 60	397 m range
			0003		EOL 60	
61			0005		SOL 61	397 m range
			0101			
			0116		EOL 61	
62		107	1526	L62F1	SOL 62 Port gain 6db Stbd gain 9db	
1			1620	L62F1.DAT	1SOL 62	397 m range
63			1624	L63F1.DAT	SOL 63	397 m range

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
63		9/04/17 107	1649	L63F1.DAT	BOL 63	
64			1655	L64F1.DAT	SOL 64	397 m range
1			1723	1	EOL 64	
65			1725	L65F1.DAT	SOL 65	397m range
1			1750	1	EOL 65	
66			1754	L66B1.DAT	SOL 66	397m range
1			1937	probably recording wrong data file	Just noticed that ISIS has date as 16 April + it should be 17 April	
			1949	L66F1.DAT	EOL 66	
			2005	L67F1.DAT	SOL 67	397m RANGE
			2110		EOL 67	
			2113	L68F1.DAT	SOL 68	397m range
			2321		EOL 68	
TVG1		108	1940	TVG1.DAT	SOL TVG port gain 3 stbd gain 3	
			194354		made sure all TVG set to STD	
			194430		go to auto tvg	
			1946		STANDARD TVG	
			1951		switched to half sec	
			2008		EOL TVG1	
					all setting put back - TVG standard	
69	1500m	swath	2010	L69F1	SOL 69	
			2034		EOL 69	
70			2043	L70F1	SOL 70	1500 m swath

* appears that JD109 had port & stbd gains @ 3db

Cruise:		Chief Scientist:			Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
		108	2109		EOL 70	
71		108	2111		SOL 71	
1			2144		EOL 71	
72		109	1559		SOL 72	
			1607	L72F1	SEISMICS TO BK MISSING	
					PINGS BTWN 40-50 PINGS	
			1616	L72F1	SOL 72 RESTART 1515	
73			1621	L73F1	SOL 73	
			1623		DGPS LOST	
			1628	L73F2	RESTART LINE 73	
			1644		ATM ROLL READING WORKING	
			1648		SOL 73	
74			1701	L74F1	SOL 74	
			1741	P 2393	c/c, but still line 74	
			1820	L74F1	EOL 74	
75			1830	L75F1	SOL 75	
			1923	P 2947	c/c - dogleg	
			2001	P 5221	c/c - dogleg	
			2010		SOL 75	
76		112	1412	L76F1	SOL 76 1500m swath	
			1418	3db port & stbd	BACKUP LINE NO GAINS	
					GAINS UP FROM 3DB TO 6dB	
			1927	L76F2	SOL 76 / END FILES (DIGITIZER PROBLEM)	
76			1928	L76F3	EOL 76	

SS SETTINGS WD 112 750m swp/FILES 16 BIT / 2048

SS GAINS - 6dB PORT
6dB STBD

Cruise:		Chief Scientist:		Area:	Page:
Line #	**Tape #**	**JulDay & Date**	**Time GMT**	**Filename**	**Remarks (seismic, nav, problems, etc.)**
76		112 01/01/22	1529	L76F3	EOL76 / EOF
77			1534	L77F1.DAT	SOL 77 / SOF 750m range
			1549		XDUCERS HOOKED WRONG (?)
					PORT & STBD CHANNELS
					REVERSED ON LINES 76 (?)
			1632		EOL 77 PULL FISH REVERSE CHANNELS
					SWAP PORT & STBD cables
					going into the bottle
			1702		XDUCERS SWITCHED CHANNELS
					RIGHT (PORT IS PORT)
78			1708	L78F1.DAT	SOL 78 750m range
			1804		EOL 78
79			1812	L79F1.DAT	SOL 79 SOF 750m range
			~~[illegible]~~		DIGITIZER LOSING LOCK ON
					START OF FILE. HARD TO WATCH
			1908		EOL 79
80			1915	L80F1.DAT	SOL 80 750 m range
			1952	Ping 2259	slight c/c in line 80
			2002	Ping 2823	slight c/c
			2006	L80F1.DAT	EOL 80
81			2021	L81F1.DAT	SOL 81 / STOP BAD DIGITIZER
			2022	L81F2.DAT	SOL 81 750m ~~[illegible]~~ range
			2107		EOL 81
82			2113	L82F1.DAT	SOL 82 750m range
			2130		EOL 82

Cruise:		Chief Scientist:		Area:	Page:

Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)
83		112 01/04/22		~~L83F1.DAT~~	SOL83
|		2139	→	112-2139	SOL83 750 m range
|		2241	→	112-2139.DAT	EOL83
84		2254	→	L84F1.DAT	SOL84 397 m range thalweg line
|		113	0035	|	EOL84
			23	April 2001	
85		113	1441	L85F1.DAT	SOL85 750 m range
|			1551	|	EOL85
86			1555	L86F1.DAT	SOL86 750 m range
|			1611	Ping 1001	gentle c/c
|			1654	|	EOL86
87			1710	L87F1	SOL 87 750 m range
|			1731	|	EOL87
88			1739	L88F1.DAT	SOL88 750 m range
|		1801	~~1801~~	|	~~[illegible]~~ EOF (~~STBD~~ PORT GAINS RNG)
|		|	1851	L88F2	SOF/EOF (DIGITIZER ERROR)
|			1851	L88F3	SOF/CONTINUE LINE 88
|			1855	|	EOL/EOF
89			1907	L89F1.DAT	SOL89/SOF 75 m range
|			1953	|	EOL/EOF
90			2001	L90F1.DAT	SOL90 SOF 750 m range
			2029	|	~~[illegible]~~ ISIS-HYPACK times good
			2054		EOL90

JD 113 SS-GAINS SUB POWER -9 dB FILES
PORT 6 dB 750 RANGE QMIPS 16 BIT/2048 SAMPLES
STBD 6 dB CHIRP LENGTH = 24 ms
SUB 12 dm

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Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
91		114/23 113	2103	L91F1.DAT	SOL 91 TSS/MMV clocks 750m range	
		113	2201		EOL 91	
92			2205	L92F1.DAT	SOL 92 750m range	
"				"	Bonnelli Bay	
"			2251		EOL 92	
93			2250	L93F1.DAT	SOL 93	
"			2329	P1972	Start dog leg	
"			2333	P2215	End dog leg	
"			2345	L93F1.DAT	SOL 93	
					~~start~~ range	
94	01/04/24	114	1733	L94F1.DAT	SOL 94 750m portgain 6db stbdgain 6db	
"			1919	"	EOL 94	
95			1925	L95F1	SOL 95 750m range	
			~~1926~~	~~L95F2~~	restarting line - funny noise in far field	
			1929		EOL 95F1	
			1935	L95F2	SOL 95	
					on line ping 85	
			2045		EOL 95	
96			2046	L96F1	SOL 96 - transit to next line - DO PROCESS	
					↳ 750 m range	
			2101		EOL 96	
97			2106	L97F1	SOL 97 750m range	
			2122	P938	c/c - dog leg	
			2200		EOL 97	
98			2205	L98F1	SOL 98 750m range	

JP 114

SS GAINS
PORT 6 STBD 6

SUB GAIN 12
POWER - 9

16BIT/8018 SM-PLUS 750m RANGE

Cruise:		Chief Scientist:			Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
98		114	2348	L98F1.ONT	SOL 98	
99		1	2259	L99F1.ONT	SOL 99	
1		115	0020	1	EOL 99	
100			0026	L100F1.ONT	SOL 100	
1			0041	1	EOL 100	
101			0047	L101F1.ONT	SOL 101	
1			0112	1	EOL 101	
			0112		RWD NAV LOGGING	
102		115	1552	L102F1.ONT	SOL 102 750m range	
			1605		ENGINE DIED - STOPPED LOGGING	
102			1857	L102F2	SOL 102 750 m range	
1			1835	1	EOL 102	
103			1841	L103F1	SOL 103 750 m range	
1			1920	ping 2306	CC	
1				P3080		
1			1932	P3080	C/C	
1			2008	L103F1	EOL	
104			2019	L104F1.ONT	SOL 104 750 m range	
			2048		EOL 104	
105			2054	L105F1	SOL 105 funky lines	
1			2054		EOL 105F1 restart	
1			2054	L105F2	SOL 105	
1			2126	1	EOL 105	

DAY 115

SS GAINS PORT 6 STBD 6

SUB GAIN 12

SUB POWER -9DB

750m RANGE

16BIT/3048

Cruise:			Chief Scientist:		Area:	Page:
Line #	Tape #	JulDay & Date	Time GMT	Filename	Remarks (seismic, nav, problems, etc.)	
108		116	1600	L108F1.009	SOL 108 397m range	
			subbot	power -9db gain 12db	port gain 6db stbd 6db	
			1651	L108F1	BACK2LINE check NAV PROB	
			1659	L108F2	CONTINUE LINE 108	
			1822	L108F2	EOF	
			1827	L108F3	SOF	
			1941	L1	EOF	
			1944	L108F4	SOF	
			2215	1	EOL 108/EOF	

A$JHISNEVG?10hJ

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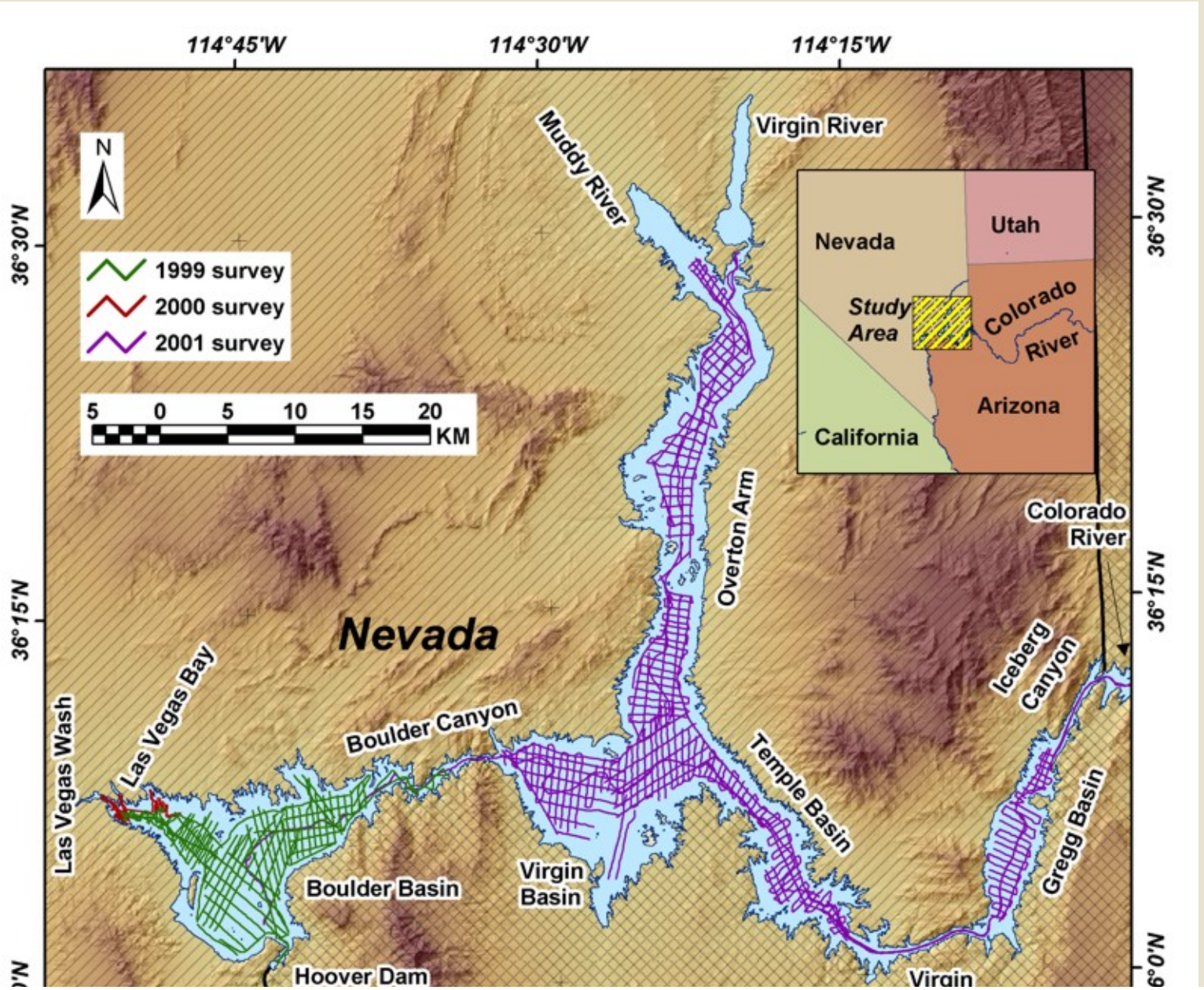

Figure 1. Map showing the locations of track lines along which seismic-reflection and sidescan-sonar data were collected during the three survey years.

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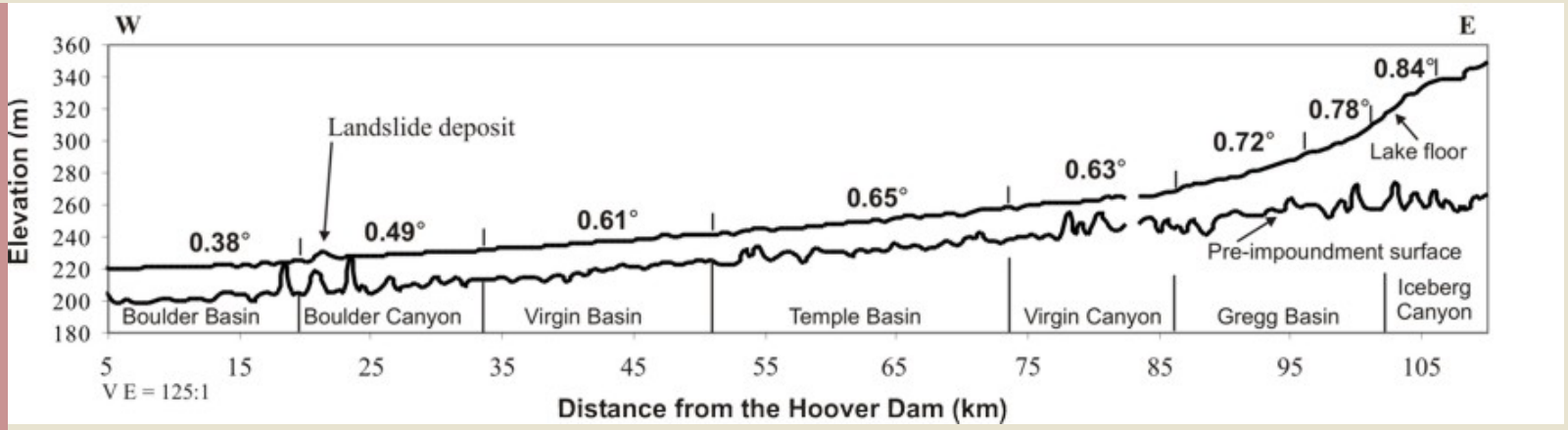

Figure 2. Profile along the thalweg of the Colorado River from the delta at the northern end of Iceberg Canyon near the eastern end of Lake Mead to the Hoover Dam. The profile shows the elevation (above sea level) of the pre-impoundment surface (the original bed of the Colorado River) and the elevation of the lake floor at the time of the survey in 2001. Average slopes for each basin are shown above the lake floor.

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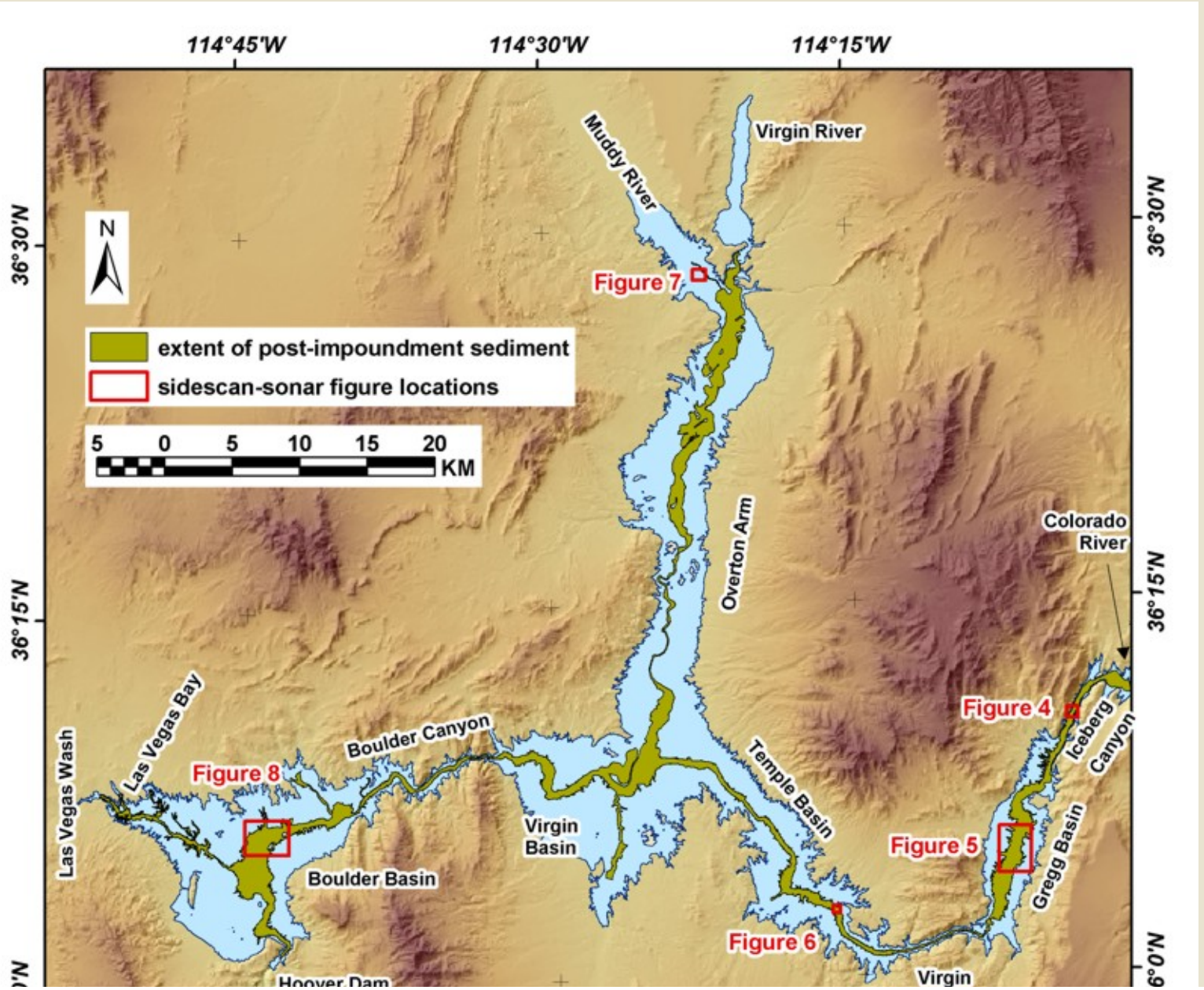

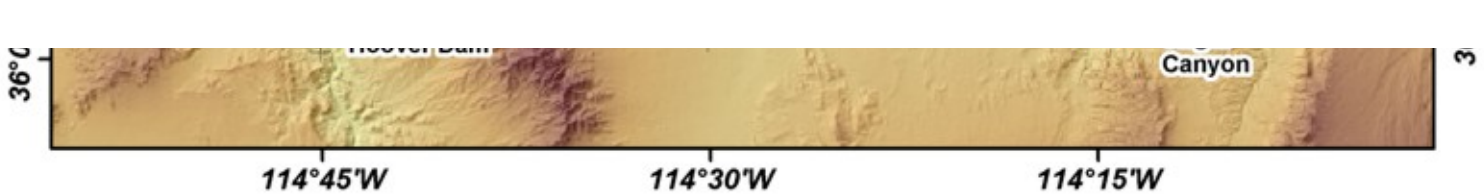

Figure 3. Extent of post-impoundment sediment in Lake Mead, and the locations of sidescan-sonar images shown in Figures 4-8.

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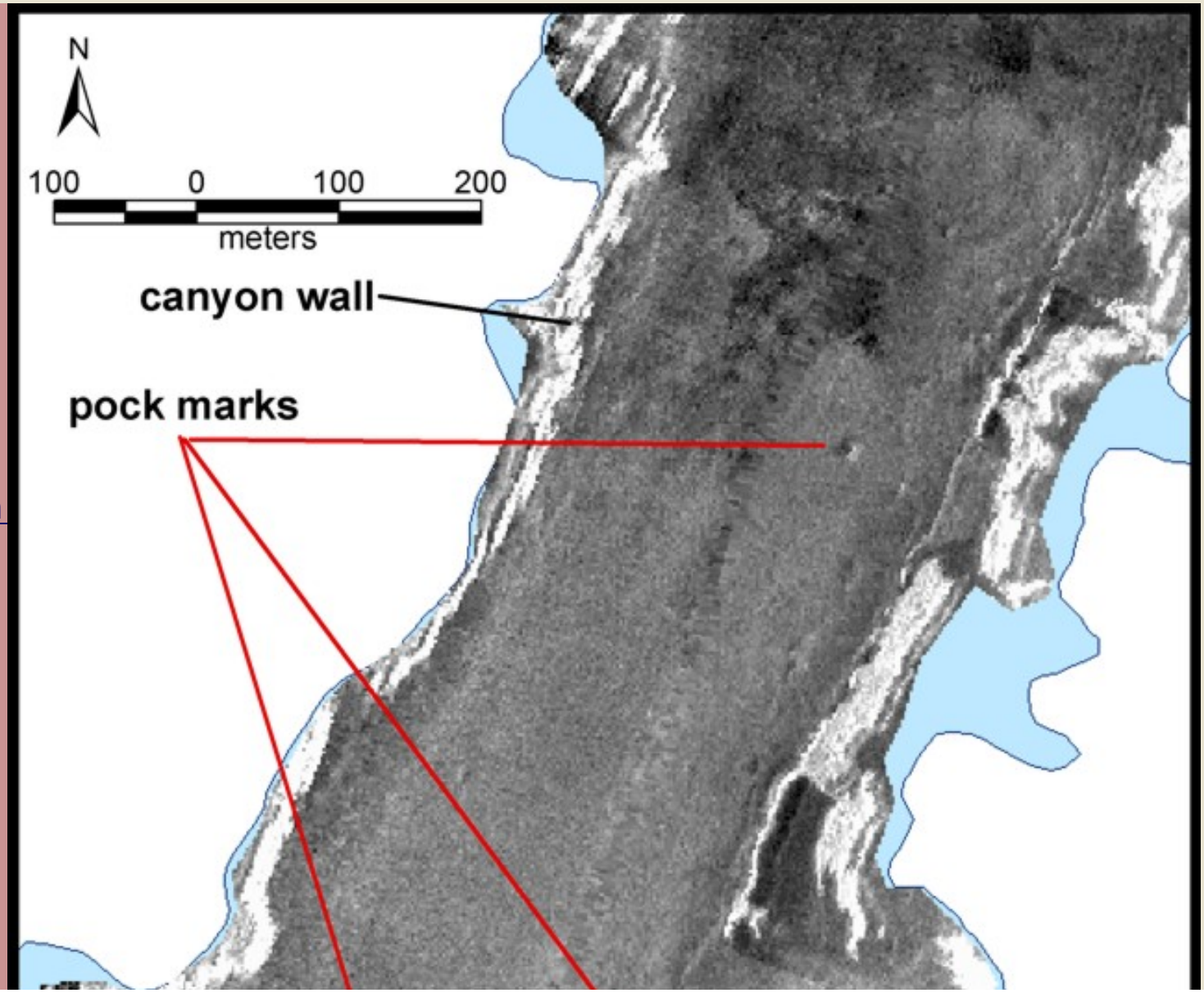

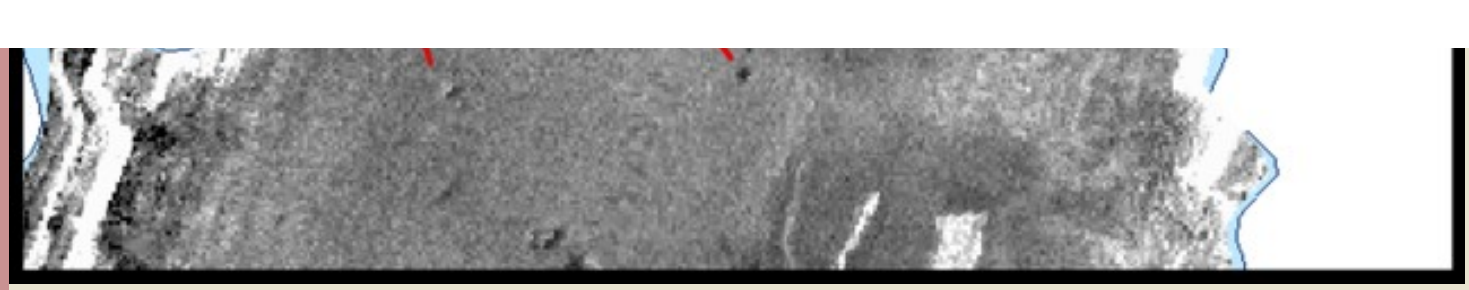

Figure 4. Sidescan-sonar image of part of Iceberg Canyon showing the high-backscatter canyon walls, the moderate-backscatter sediment on the canyon floor, and pockmarks dimpling the post-impoundment sediment surface. The pockmarks appear to be gas-escape structures. The location of this figure is shown in Figure 3.

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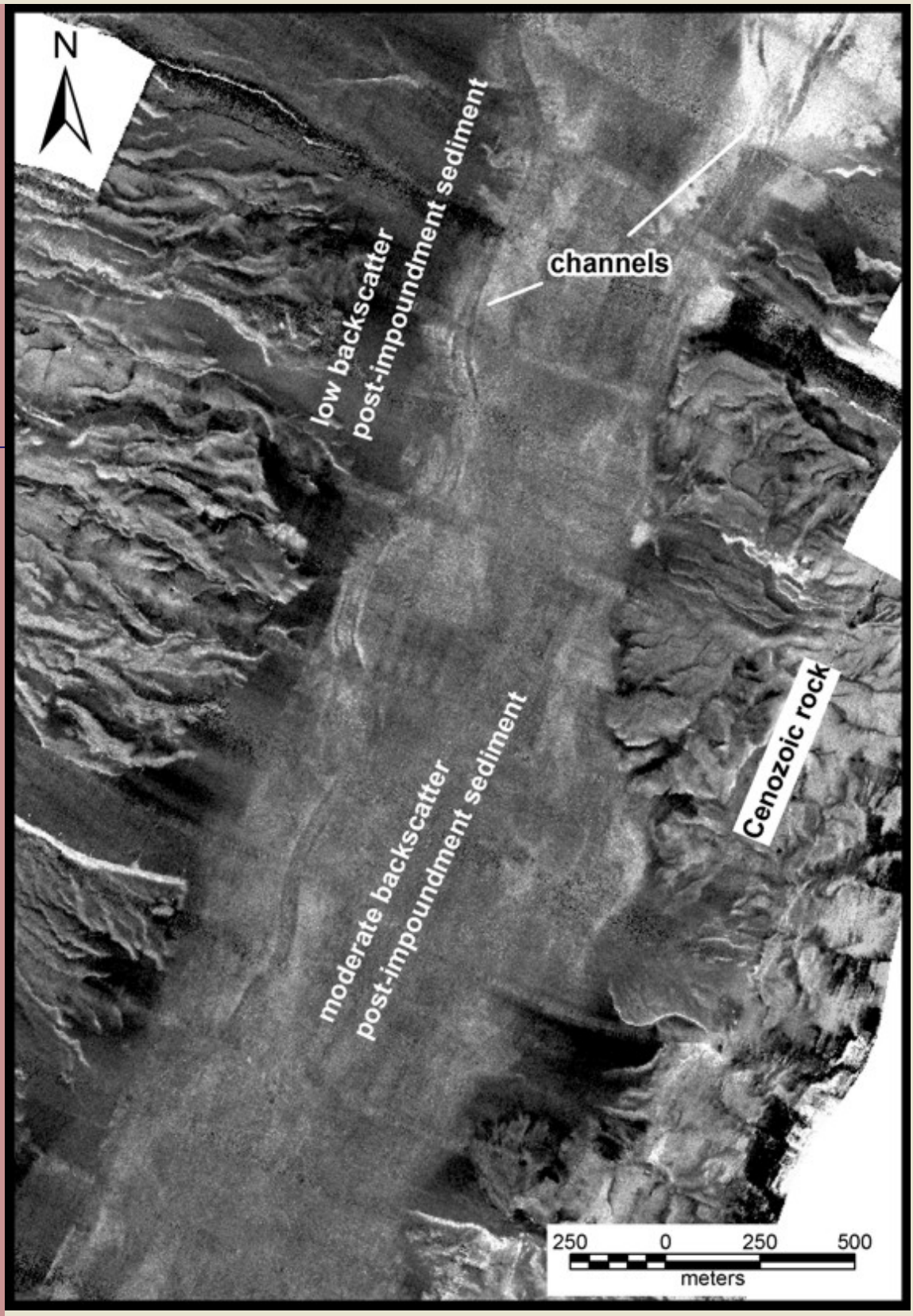

Figure 5. Sidescan-sonar image of the central part of Gregg Basin. Post-impoundment sediment covers the basin floor, and it is fringed on the west by Quaternary alluvial fan deposits and on the east by outcroppings of Cenozoic rocks. The post-impoundment sediment has a moderate backscatter surface along the axis of the basin while it has a low-backscatter surface in embayments along the edges of the basin. Two channels etch the surface of the post-impoundment sediment. Location of figure is shown in Figure 3.

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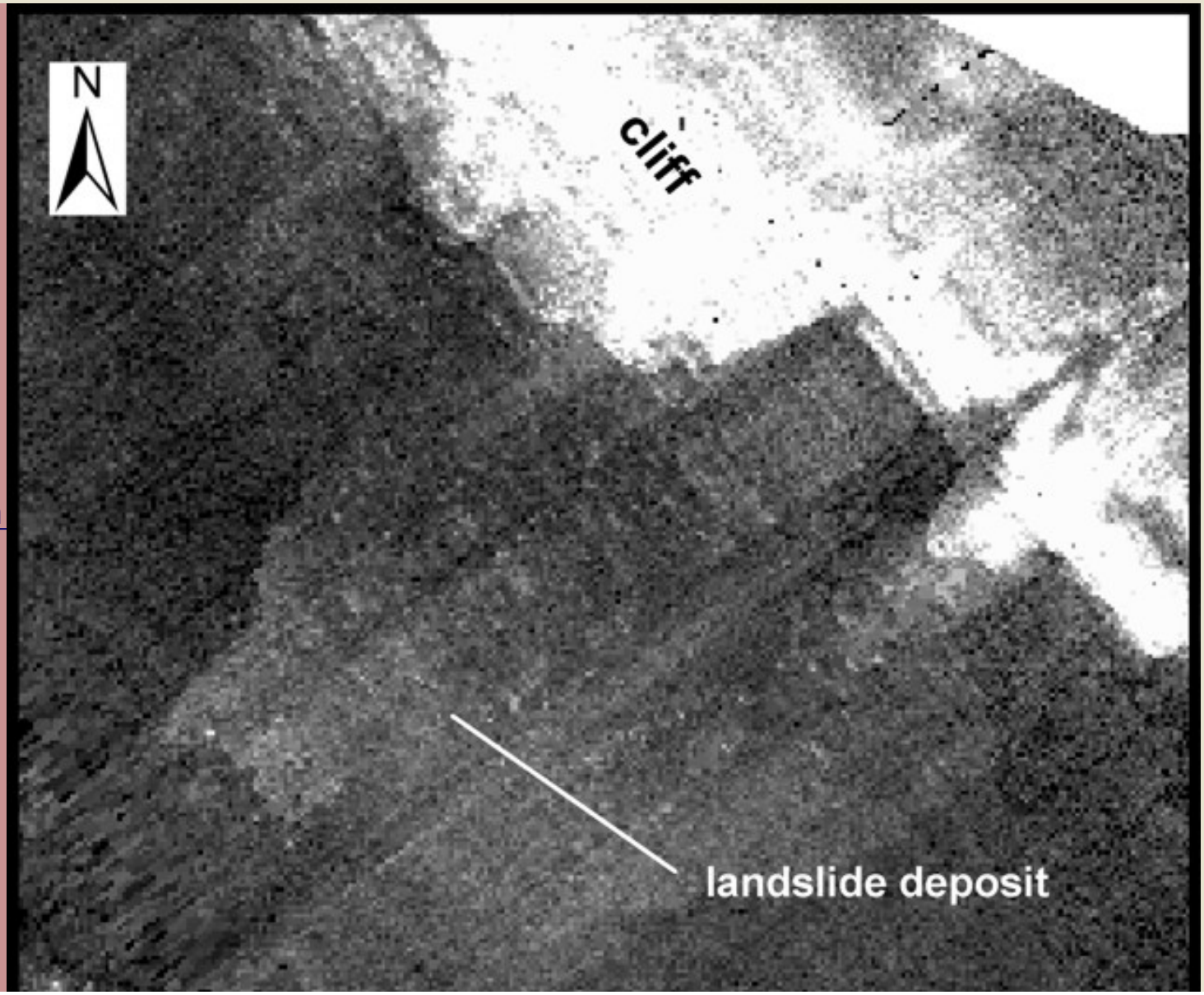

Figure 6. Sidescan-sonar image of a small landslide in the eastern part of Temple Basin (see Figure 3 for location). The moderate backscatter patch on the sidescan-sonar image shows the extent of the landslide, and the higher-backscatter targets within this area probably are larger clasts associated with this failure. The cliff to the northeast of the landslide is the source for this failure.

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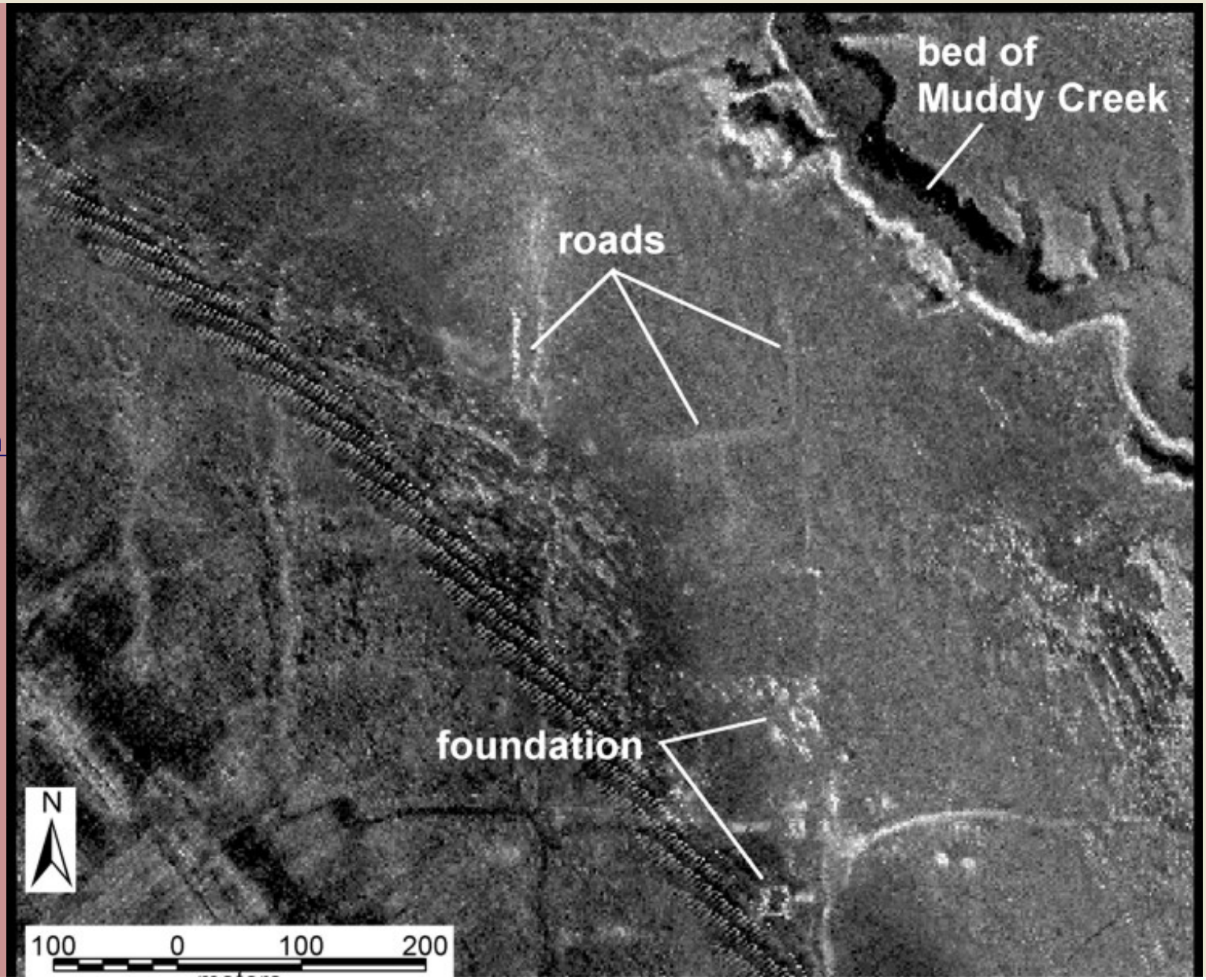

Figure 7. Sidescan-sonar image of the town of St. Thomas, which was submerged shortly after Lake Mead started to fill. The streets trend north south and east west, and some of the high-backscatter targets are foundations. The former channel of Muddy Creek has not been filled with sediment and still shows in the northeast corner of the image. The figure location is shown in Figure 3.

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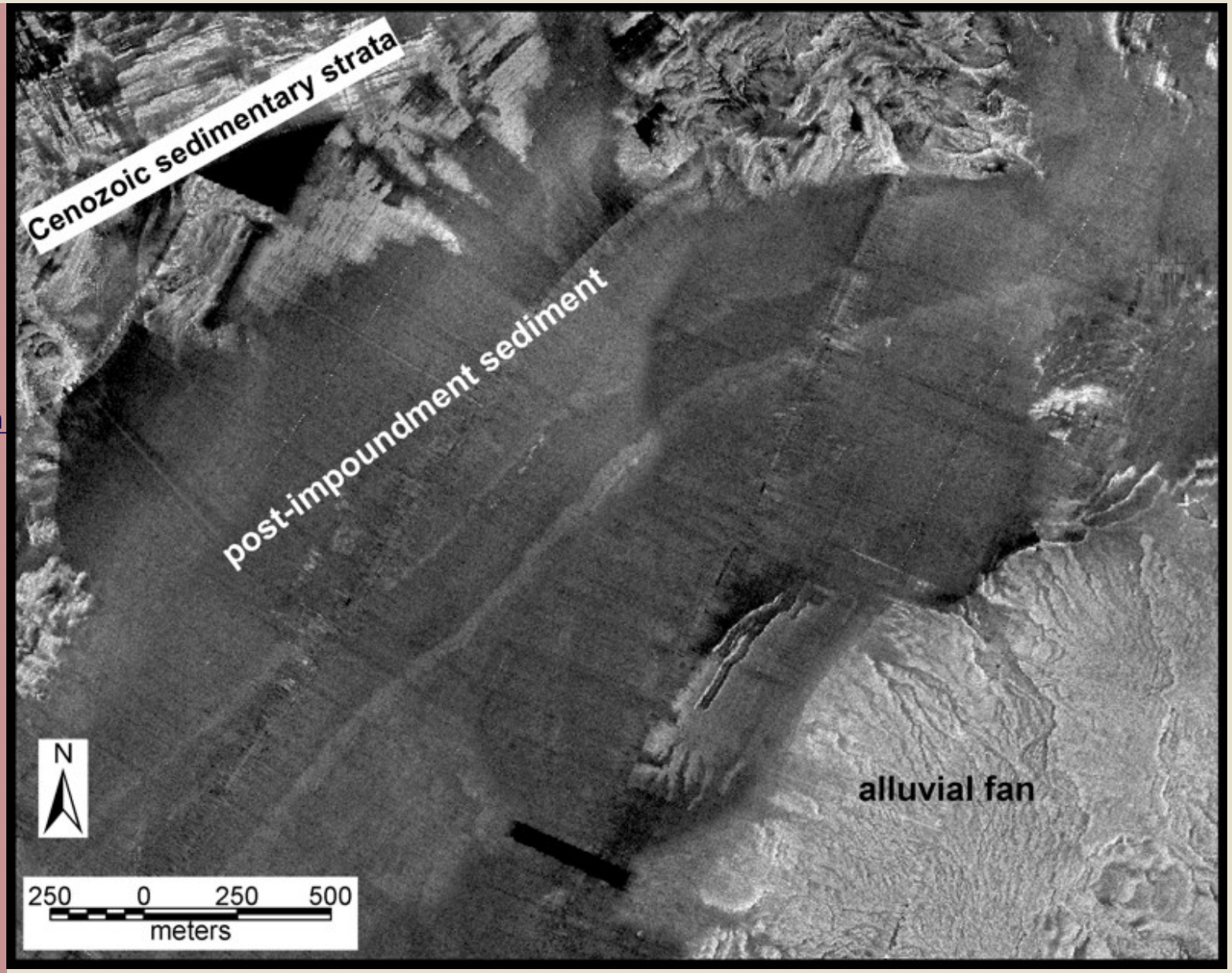

Figure 8. Sidescan-sonar image showing part of Boulder Basin. The post-impoundment sediment has a low-backscatter signature (in contrast to Gregg Basin), and it is bounded to the south by alluvial fans and to the north by exposures of Cenozoic sedimentary strata. The two sub parallel, linear, moderate backscatter bands that cross the center of the post-impoundment deposit overlie the flanks of the Colorado River. Here the post-impoundment sediment is approximately 15 m thick, and preservation of the channel flanks on the present lake floor is probably due to compaction of the post-impoundment sediment after deposition. The figure location is shown in Figure 3.

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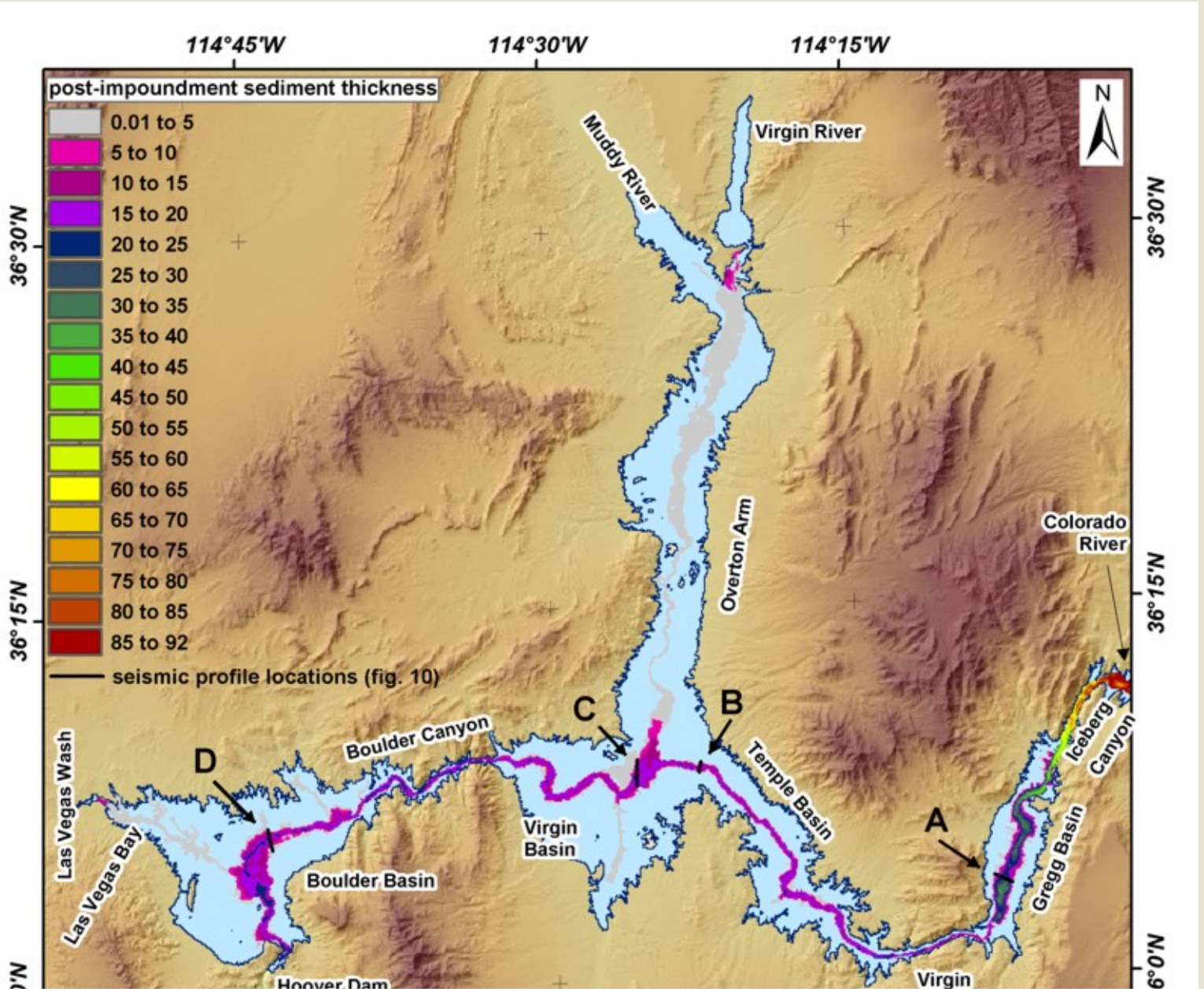

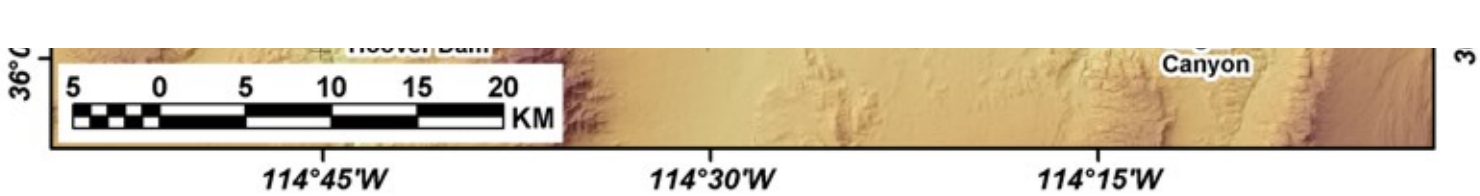

Figure 9. Map showing the thickness of post-impoundment sediment in Lake Mead. These sediments have accumulated since completion of the Hoover Dam in 1935. The thickest part of the deposit fills the valley of the Colorado River, while the Virgin River valley in Overton Arm and the Las Vegas Wash valley in Las Vegas Bay both have a much thinner sediment cover. The reason for this sediment distribution is because the Colorado River supplies the majority of the sediment to the lake. Sediment is limited to the deepest parts of the valleys because of dispersal by density flows. The lettered bars mark the locations of profiles shown in Figure 10.

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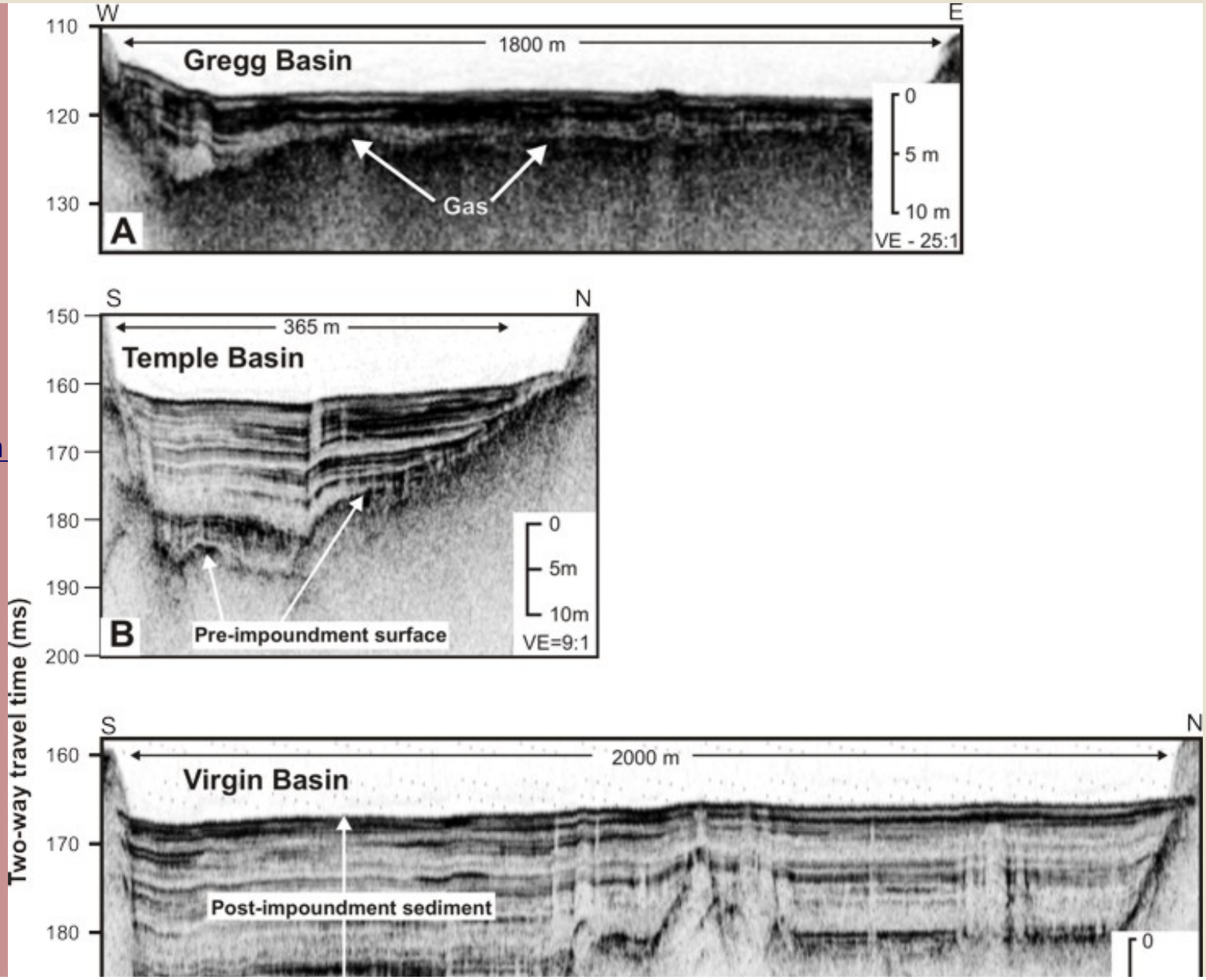

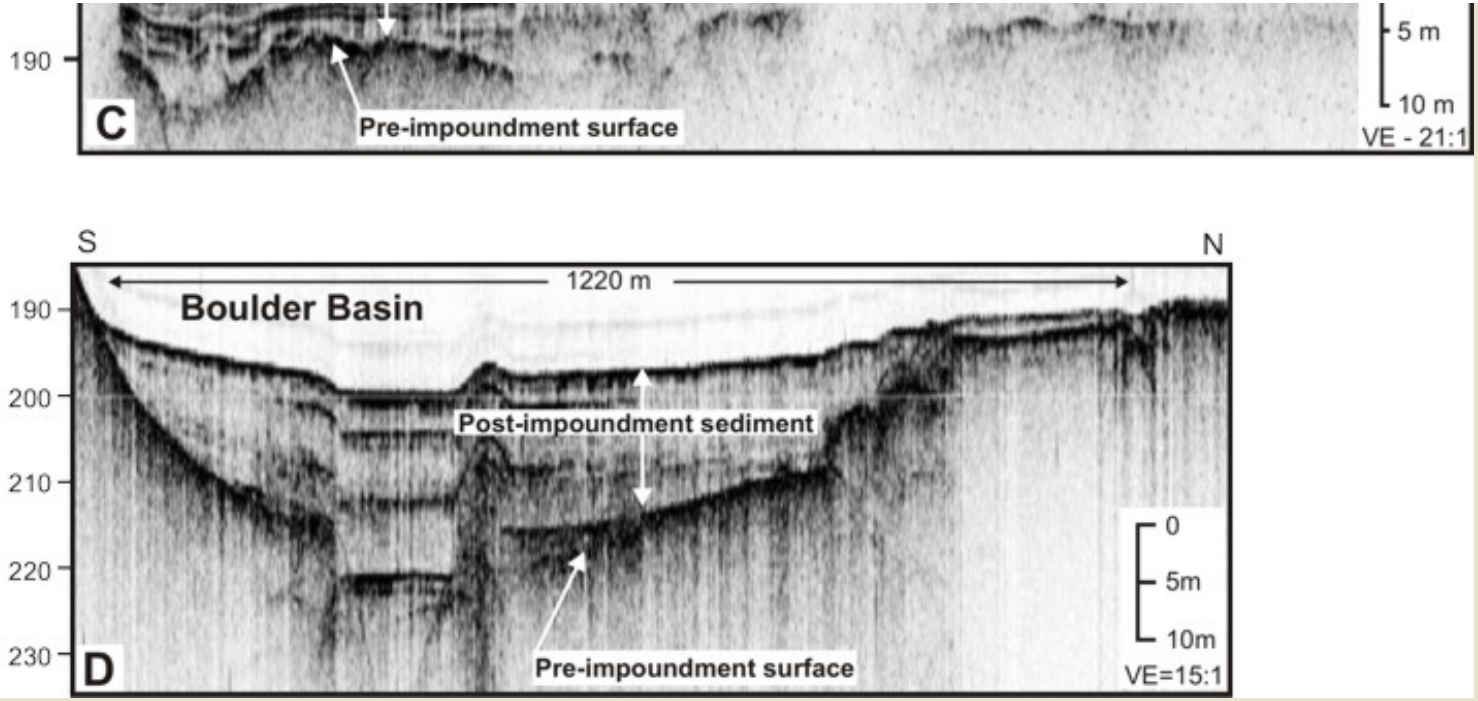

Figure 10. Seismic-reflection profiles across areas covered by post-impoundment sediment in Lake Mead. Profile A is from Gregg Basin, and there, only the uppermost part of the post-impoundment sediment can be imaged before gas in the sediment completely blanks the acoustic signal. In profiles B, C, and D the acoustic signal penetrates to the pre-impoundment surface. On profile D, note that the morphology of the pre-impoundment Colorado River bed is mimicked, although with reduced relief, on the lake floor. Profile locations are shown in Figure 9.

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system/parameter	*1999 survey*	*2000 survey*	*2001 survey*
navigation	P-Code GPS	P-Code GPS	P-Code GPS
navigation storage software	USGS software	Coastal Oceanographics Hypack	Coastal Oceanographics Hypack
sidescan-sonar towfish	Benthos SIS-1000	Edgetech DF-1000	Benthos SIS-1000
Swath widths	1500m, 750m	200m	1500m, 800m
Chirp seismic system	Benthos SIS-1000	Knudsen	Benthos SIS-1000
Chirp fire rate or range	one second half second	50m, 100m, 200m	one second 0.53 second
Boomer seismic system	none acquired	none acquired	Benthos streamer, Geopulse sound source
Boomer fire rate	NA	NA	Half second
Boomer logging system	NA	NA	Delph-Elics
km survey lines	366	77	955

Sidescan logging system	ISIS Triton-Elics	ISIS Triton-Elics	ISIS Triton-Elics
Chirp logging system	ISIS Triton-Elics	Knudsen software	ISIS Triton-Elics
Survey vessel	19-m houseboat	8-m pontoon boat	19-m houseboat
Fathometer	Odom fathometer	Garmin fathometer	Odom fathometer
Primary survey area (see Fig. 1)	Boulder Basin	Las Vegas Bay; Las Vegas Wash, Government Wash, Gypsum Wash	Remainder of Lake Mead east of Boulder Basin

A more complete description of these systems as used by the USGS can be found on the USGS Seafloor Mapping website.

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